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ORIGINAL ARTICLES.

ANOTHER CHAPTER ON PHTHISIOPHOBIA; AND RESOLUTIONS ADOPTED BY THE NEW YORK ACADEMY OF MEDICINE.¹

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SINCE my recent address on "Official and Private Phthisiophobia"² I have been the recipient of numerous letters, some encouraging and approving my attitude, some abusive, some asking for information, and so on. I will make no attempt to answer all of them; only to the more pertinent inquiries, and perhaps also to the accusations, shall I reply.

First the question, "What is it all about?" These resolutions before you are certainly not offered solely on account of the few dozen tuberculous immigrants who are so far gone that their disease can be rapidly diagnosed by simply marching them in file before the Quarantine officer; it is above all the principle which is involved. Is it right, is it scientific, is it just, and it is humane to declare pulmonary tuberculosis a dangerous contagious disease, and to debar on that account not only the non-pauper tuberculous immigrants, but also all alien visitors to these shores who may suffer from pulmonary tuberculosis? That there may be no mistake about this, permit me to make the following statement: The Immigration Commissioner, Hart N. North, of San Francisco, who had some doubt about this ruling, communicated recently with the authorities in Washington and received the reply that in regard to barring consumptives from American ports there was to be no class distinction, but that all must be treated alike.

It has been doubted by some that any ruling at all had taken place. With praiseworthy conservatism this Academy postponed action on these resolutions until having heard directly from the Treasury Department in Washington. The reply to the inquiry was that the ruling in question consisted of the promulgation of a written opinion on the matter proposed by the supervising Surgeon-General of the Marine-Hospital Service to the effect that tuberculosis of the lungs is a dangerous contagious disease.

What thus far have been the consequences of this ruling? A very small number of immigrants have been debarred, but on the strength of this government declaration not only tuberculous patients in the first stage of the disease, who were trained to take care of their sputum, have lost employment, but individuals who were simply suffering from an innocent cough, and

others who had only the misfortune of being obliged to live with a consumptive, were discharged because their employers or fellow-workers feared contagion. Municipalities, situated in particularly healthy regions, which formerly allowed their unsupervised boarding-houses to be crowded with consumptives—which was unsafe and unwise—have gone now to the other extreme, prohibiting the establishment or the existence of well-conducted sanatoria in their neighborhood. Yet it is known to us all that there is not the slightest danger from well-conducted sanatoria; they are, on the contrary, veritable schools of hygiene, exerting a most beneficial influence by educating the people at large in preventive measures.

One of the most remarkable incidents in connection with this insane fear was recently related in *American Medicine*, under the false heading "False Preaching and an Over-zealous Convert." It reads as follows: "Those who would spread among the community by deportation of tuberculous immigrants, etc., a belief that tuberculosis is a dangerous contagious disease, should consider the results that may follow the acceptance of such teaching upon the part of ignorant and panicky people. An excellent illustration is an incident that occurred recently at Frederick, Maryland. A church trustee met a funeral procession at the door of the church and refused to allow services to be held over the body of a woman who had died of tuberculosis. This obstreperous person carried his point, causing hardship and arousing great bitterness of feeling. This is a good method of making people hate even legitimate methods of encouraging preventive medicine."

I have spoken of what the consequences of this ruling have already been, and mentioned some of the manifestations of official and private phthisiophobia. Let me now speak to you of the more serious results that will come if this insane fear continues. Individuals who are suffering with the early symptoms of tuberculosis, or others who feel themselves in danger of becoming consumptive, will hesitate to seek medical advice for fear of being declared to suffer from a dangerous contagious disease and becoming subject to social ostracism. What a fearful loss of life a retarded diagnosis in pulmonary tuberculosis means I need hardly dwell upon in an audience of physicians. All our hopes in phthisiotherapeutics are centered on the early recognition of pulmonary consumption. Our American sanatoria report as many as 75 and more per cent. of recoveries of incipient cases. How very much lower the percentage of cure is when the patients have passed the incipient stage we all know only too well.

¹ Resolutions made at the meeting of the New York Academy of Medicine, Feb. 6, 1902, in support of the resolutions.
² *N. Y. Med. Record*, January 11, 1902.

In an open letter to the New York *Medical Record* of February 1st Dr. A. L. Benedict of Buffalo says that I was pleading against the United States Marine Hospital Service for the admission of poor consumptive foreigners. If this was meant to imply that I favor pauper immigration, I beg to protest. I have said distinctly and repeatedly in previous publications on this subject, and particularly in the one referred to by Dr. Benedict, that pauper immigrants should not be admitted, whether tuberculous or not. The same correspondent, who headed his letter "The Good in Phthisiophobia," says: "Destroy phthisiophobia and you might just as well abandon the fight." There can be no good in any kind of phobia, or madness, and phthisiophobia is madness. There is a vast difference between phthisiophobia and a healthy fear of the transmission of the disease. I am most anxious to destroy the former, most willing to encourage the latter. Thus far the experience in the antituberculosis crusade, not only in this city but all over the world, has taught us that a great deal more can be accomplished by instructing the patient and his family, and that it is wiser to educate people than to frighten them into obedience of sanitary laws.

Another question has been asked which seems to me worthy of reply: "What is the difference between a dangerous contagious and a communicable disease, anyhow?" The word contagion, coming from the Latin *contagio*, conveys the idea that the disease is transmitted by the mere touch of the afflicted individual. This is not possible in tuberculosis, although the consumptive may be even what is commonly called unclean and careless. Only prolonged exposure to the inhalation of the germs, particularly within walls, becomes dangerous. Prolonged contact with the consumptive who takes care of his expectoration and other secretions which may contain the bacilli is absolutely without danger. In sanatoria for consumptives where the precautions concerning the sputum are most strictly adhered to, one is perhaps safer from contracting tuberculosis than anywhere else. The great danger from tuberculosis lies in the indiscriminate deposit of tuberculous sputum, which, when dry and pulverized, may be inhaled by susceptible individuals and then cause the disease to develop.

The communication of the germ of the disease is, however, not obscure to us in its process, and is far more easily guarded against than in any of the dangerous contagious diseases, such as smallpox, diphtheria, scarlet fever, etc. The contact, short or long, of a smallpox patient is dangerous under almost all circumstances, and what has been previously said of the sanatorium as being the safest place from contracting tuberculosis, can not well be said of even the best kept smallpox hospital in regard to variola. We know the latter disease to be dangerously contagious, but we do not as yet know the germ of contagion nor its process of dissemination. We know it exists and can only guard ourselves by

preventive vaccination and isolation at the moment of the breaking out of the disease. The difference in relative danger of transmission of the disease and in the control of the contagium between smallpox and tuberculosis illustrates perhaps better than anything else the meaning of "communicable" and "dangerous contagious."

It has been said that these resolutions were a one-man opinion. There is nothing easier for me than to refute this assertion. Long before I appeared before you with these resolutions, no less an authority than Prof. Hermann M. Biggs, of this city, publicly declared this action of the Treasury Department unnecessary, inhumane, and unscientific. Before submitting these resolutions I showed them to my honored teacher, Prof. Janeway, and I not only had his approval, but he also expressed his fear that if the Treasury Department continued to insist upon carrying out these laws there would be retaliation on the part of European governments. Prof. Janeway distinctly declares that tuberculosis is only a communicable and not a dangerous contagious disease. Dr. Andrew H. Smith, it may be remembered, at the last Academy meeting, graphically described the unnecessary cruelty inaugurated by the Treasury Department. Dr. Shrady of the New York *Medical Record* says in a recent editorial: "While the senseless scare lasts the consumptive has a poor chance for decent harbor or proper treatment. The sick immigrant is not only prevented from landing on our shore, but the native is forbidden to take his chance in health resorts. He must in many quarters not only be treated as an outcast, but allowed to die like one." Dr. Foster of the New York *Medical Journal* considers the United States Bureau of Immigration ill advised, and Dr. Geo. H. Simmons of the *Journal of the American Medical Association* wrote to me: "The resolutions presented to the Academy of Medicine are to the point and express the opinion, I believe, of about 90 per cent. of the best men in the profession who have given thought to the subject." Dr. Geo. B. Fowler, ex-President of the New York County Medical Society, writes me that his views on the subject coincide with mine exactly. The Secretary of the Wisconsin State Board of Health, Prof. U. O. B. Wingate, says: "The action of the head of the Marine-Hospital Service in this matter is simply inhumane." Dr. August J. Lartigau, of the Pathological Department of Columbia University, writes: "The good service which the article on phthisiophobia does deserves the support and consideration of all men interested in medicine, and more especially in the broader humanizing aspect of this question."

Dr. A. H. Doty, the Health Officer of the Port of New York, writes me: "As you probably know, I have already publicly expressed my opinion regarding the ruling made by the Commissioner of Immigration in regard to the return of immigrants affected with tuberculosis who may reach this port. It is known that I am decidedly opposed to it. I shall be glad to have

you mention my name in your introductory remarks on February 6th, and also to state that while in Washington next week I shall do all I can to bring about a repeal of the obnoxious ruling recently made by the Commissioner of Immigration."

Prof. Prudden wrote: "I regret that I can not be present at the meeting of the Academy of Medicine and so shall not be able to speak as I should like to do in favor of the resolutions concerning the ruling of the Treasury Department on tuberculosis. I think that the resolutions admirably cover the ground of a dignified and earnest protest. It is, indeed, discouraging that the advice upon which the Treasury Department of the United States appears to have acted in this matter, in this period of growing enlightenment regarding infectious disease in general and tuberculosis in particular, should ignore the revelations of two decades of beneficent research, and imply so crude a conception of the solution which modern science has to offer to this serious problem of preventive medicine."

I could continue thus in quoting from the letters of approval which I have received, but I trust that this will suffice at least to show that these resolutions are not a one-man opinion. I will ask permission to read only one more extract of a letter. I have kept it for the last because I treasure it most, for it comes from the gentleman who honors us to-night by presiding over this assembly. Prof. Peabody says: "As I do not from the Chair feel justified in taking part in the discussion, I should be glad to be referred to as strongly favoring the sense of your resolutions when you next take the floor in their support."

It only remains for me now to read the resolutions to you once more.

Upon the advice of elder and more experienced members of the Academy, some of whom belong to the Council, I present these resolutions to-night somewhat shortened and slightly changed in their wording.

Whereas, The Treasury Department of the United States, upon recommendation of the Surgeon-General of the Marine-Hospital Service, has recently decided to classify pulmonary tuberculosis with dangerous contagious diseases, be it

Resolved, That the New York Academy of Medicine deeply deplores this decision, which is not based on either clinical experience or on scientific experiments.

Resolved, That the Academy considers the exclusion of non-pauper tuberculous immigrants and consumptive aliens visiting our shores unwise, inhumane, and contrary to the dictates of justice. Be it further

Resolved, That, while the Academy is convinced of the communicability of tuberculosis and urges all possible precautions against the spread of the disease occasioned by sputum and tuberculous food, the Academy is opposed to all measures by which needless hardship is imposed upon the consumptive individual, his family, and his physician.

These resolutions were submitted to the New York Academy of Medicine on January 2d. In compliance with the laws and regulations of the

Academy they were referred to the Council and held over for action until the next meeting, which took place on January 16th. At that meeting the resolutions were seconded by Dr. Edward G. Janeway, and the discussion brought out the desire to hear directly from the Treasury Department before voting upon them. Upon motion of the author of the resolutions, action on these was deferred until the next meeting so that the Secretary of the Academy could write to Washington for additional information. The answer of the Treasury Department as quoted was received in due time. The resolutions were put to vote at the regular meeting of the Academy of February 6th and were finally adopted. The Secretary of the Academy was instructed to forward a copy of the resolutions to the Treasury Department, the Surgeon-General of the Marine-Hospital Service, and to the Secretary of the New York State Medical Society.

It may not be without interest to add to this second chapter on phthisiophobia a few explanatory notes, and also to show the attitude which our highest official, the President of the United States, Theodore Roosevelt, takes in this matter. As it will be recalled, Mr. Francis Tracy Tobin, of Philadelphia, appeared several months ago before the United States Circuit Court in Brooklyn on behalf of Thomas P. Boden, a well-to-do Irish immigrant, who had been detained by the immigration authorities because he was suffering from pulmonary tuberculosis. My testimony to the effect that pulmonary tuberculosis was not a dangerous contagious, but only a communicable, malady, that the contact *per se* could not transmit the disease, and that ordinary precautions with the patient's sputum and other secretions would suffice to do away with all danger of infection was overruled by the Judge upon motion of the counsel for the Government. Exception was taken by Mr. Tobin for the purpose of enabling him to bring this matter before the Supreme Court of the United States for decision.

Upon the request of Mr. Tobin I gave a written opinion on the aspect of the case, quoting also the various European and American authorities on the subject of the communicability of pulmonary tuberculosis. Mr. Tobin enclosed a copy of this opinion in a direct appeal to the President of the United States, and Mr. Roosevelt immediately issued an order for Boden to land. I hope that this example of our honored President will put a stop to all further manifestations of official and private phthisiophobia.

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INTRAVENOUS INFUSION OF SALINE SOLUTION.¹

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It is well known clinically that certain cases of shock are not much benefited by saline infusion. The effect of the solution at varying temperature, the cause of death following excessive infusion, the dilution of blood, the effect upon respiration.

¹The protocols of the sixty experiments on dogs, of which the following is a summary, are published in full in the original essay.

the effect in shock and in normal animals and other phases of the question were taken up.

SUMMARY OF EXPERIMENTAL EVIDENCE.

In the following group the infusion was continued until death.

Circulation.—The intravenous injection of saline solution at or near normal temperature into the circulation of the animal, from a height producing a pressure greater than that of the blood, usually caused a rise in the blood-pressure. The beginning of this rise appeared as soon as the force of the stream was added to that of the cir-

was, an increase in the length of the stroke occurred. The frequency of the heart beats was usually diminished. The general characteristics of the blood-pressure appeared from the time at which it reached its maximum height, after the beginning of the flow, to the time when the beginning of the final decline occurred. The curve was remarkably even; if at the beginning of the flow the curve was irregular, the saline injection usually prevented its continuation, establishing a mean level. When, as a result of the continuous flow, death was produced by an excessive amount, the beginning of the death phenomena was

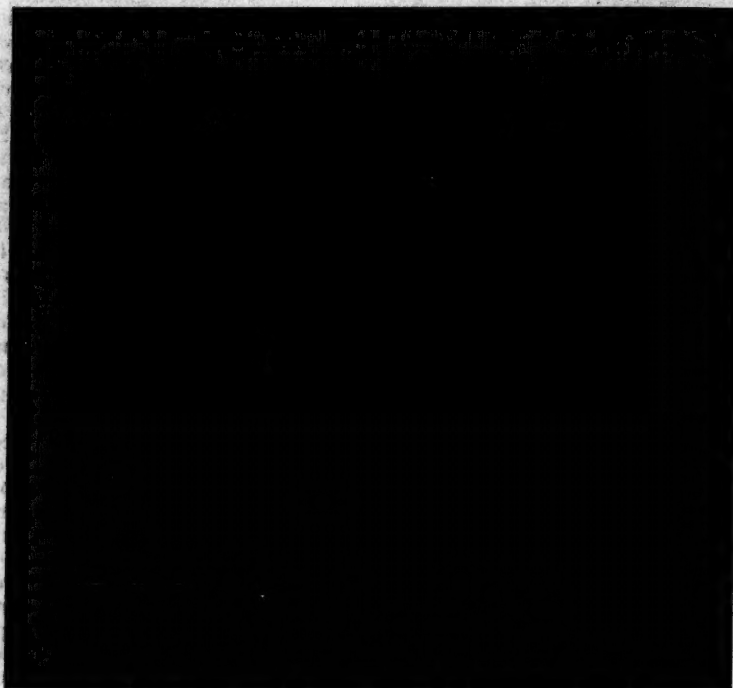


Fig. 1—a, respiration; b, blood-pressure; c, signal; d, seconds. Note the contrast between the effect of injecting cold and warm solutions. The first effect after injecting the cold is a fall in blood-pressure and an increase in the length of the stroke, the pressure quickly rising after cessation of the flow. The hot solution caused an immediate rise, followed by an equal fall on cessation of the flow. The final effect the same.

ulation. The rise was sometimes abrupt, sometimes gradual, appearing at once or after a lapse of a short time. In almost every instance a point was soon reached above which no amount of saline solution, irrespective of the height to which the bottle was elevated, could raise it. As a rule the increase in the height of the blood-pressure was but slight, varying from two to six or eight millimeters of mercury. In a small number of the experiments there was immediate temporary fall. This was usually rather abrupt, and in every instance a recovery to the previous level was made or the pressure rose even higher.

The character of the heart strokes in many instances was not altered; but, in cases in which it

marked by the gradual decline in the blood-pressure, and in no instance was it possible to stop such downward tendency. The heart beats composing this curve were characterized by their becoming for a time increasingly longer, then gradually shorter, until the last beat. The frequency was generally diminished from the beginning of the final decline, and if, during this descending curve, the animal executed a respiratory movement, even though it were but a gasp, a very marked alteration in the blood-pressure curve was produced, that is to say, the final descending curve presented the essential characteristics of death from asphyxia.

The preceding remarks apply to the experi-

ments in which normal saline solution at the temperature of the body was given to normal animals in a continuous injection until death. If at any time after a sufficient amount of saline had been administered to raise the blood-pressure to the maximum, the animal's foot was burned or other injury inflicted, an additional rise would follow; this rise, however, was not so high as in the cases in which no infusion had been previously given. It was also observed that the inhalation of even a few drops of chloroform caused an immediate but gradual fall in the blood-pressure, occasionally marked. Ether, as a rule, produced no change in the blood-pressure. The effect of chloroform was the more marked the greater the amount of saline previously given. As to the effect of administering the saline at different rates of flow, the more rapidly it was introduced, the more quickly the blood-pressure reached the highest point in that particular case, but the final height was the same. When introduced with great rapidity the animal, though under full surgical anesthesia, would respond in a peculiar subconscious way, showing a tendency to struggle.

The Effect upon the Blood Itself.—On making blood-counts by means of a Thoma-Zeiss instrument before and during the saline infusion a decrease in the number of red cells was usually shown. The blood-counts, however, exhibited a great variation in the different experiments. In two they showed an actual increase in the number of red cells, but, as a rule, the number fell, generally from 20 to 25 per cent. The blood-counts, though very carefully made, in the same experiment at different stages showed varying results, and in some instances after considerable diminution there would be a secondary increase. The variation in the blood-count was not proportional to the amount of infusion. The tendency to clot seemed to increase with the infusion; this was especially marked in the blood from the liver, in which the color grew darker from the time of the beginning of the final descent of the blood-pressure until the end; earlier its color was a lighter red. There was a very marked increase in the tendency to hemorrhage especially from the small vessels. Wounds made before the introduction of the saline and which had become dry began to ooze soon after the beginning of the infusion. The temperature in many instances was slightly raised. The foregoing applies to a dog under surgical anesthesia in which normal saline solution at the temperature of the body was allowed to flow until death occurred.

On Respiration.—The respirations were increased or diminished according to the circumstances. If saline was introduced rapidly, the alteration both as to increase in frequency and in the amplitude of the stroke was more decided. This increase did not continue, but after a period of time corresponding fairly well with that allowed for the circulatory changes to reach their maximum the respiratory rhythm returned

nearly to the normal. As the animal became increasingly under the effect of the infusion, the respirations decreased in frequency while the amplitude of the excursions increased. The abdominal factor of respiration gradually diminished until it was lost, and the costal factor alone assumed the burden. This factor soon began to fail, death ensuing. When once this tendency was inaugurated, it continued until the end. In every instance after the appearance of these phenomena death ensued without even a temporary

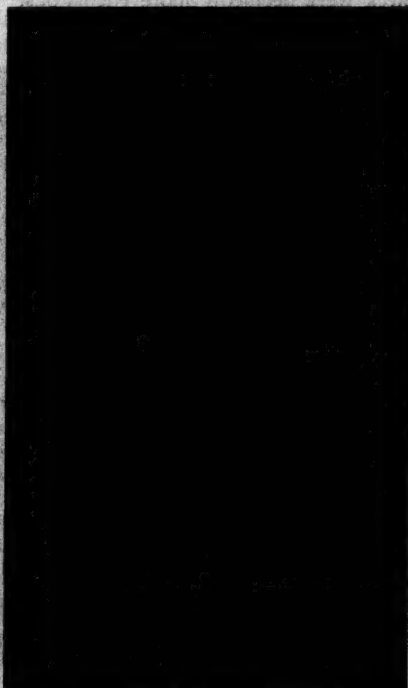


Fig. 2—*a*, respiration; *b*, blood-pressure; *c*, signal; *d*, seconds. While the saline solution was flowing into the jugular, one-half dram of chloroform was administered. Note the marked fall in the blood-pressure during the inhalation and the compensatory rise following the removal.

improvement. During the latter part of this period the extraordinary muscles of respiration were brought into action, the respiration becoming gasping. The respirations always failed before the heart; all the animals died of respiratory failure. The characteristic decline of the blood-pressure curve, referred to under the heading "Effects upon the Circulation," were inaugurated after respiration had ceased, *pari passu*, with the development of the later saline phenomena. Coarse, moist râles of varying intensity developed, which were first heard most distinctly over the pulmonary bases, then over the entire chest, and later could be heard when standing near the dog board. During this stage of the experiment dulness over the pulmonary bases developed, extending afterwards over other portions. In the greater number of the experiments the tracheal cannula became filled with

fluid having a consistence varying from tenacious to watery; sometimes it seemed to consist of bloody serum, at other times of a frothy mucus. In some instances this fluid collected in such quantities as to materially interfere with the respiratory action, making it necessary to tilt the dog board and turn out the fluid.

Effect upon Tissues and Organs.—There was an increased amount of fluid in the skin. The muscles of the extremities contained a slightly increased amount of fluid and those of the trunk and neck were decidedly more edematous. The connective tissue was more moist than normal and occasionally was emphysematous. The heart was always in diastole, the chambers widely distended and usually filled with clots. No fluid was in the pericardium. The heart muscles were somewhat edematous. The venous trunks were everywhere distended, imparting to the touch the sense of a decidedly increased tension. The smaller veins also were distended, especially the mesenteric and the subcutaneous. The capillaries and the smaller vessels of the gastro-intestinal tract almost disappeared. In the lungs, underneath the capsule of the kidney and in the walls of the stomach there was in many cases capillary hemorrhage. The same was noticed, in some instances, under the coverings of the brain. The arterial system was not distended. The portal circulation was greatly engorged.

Respiratory Tract.—The mucous membrane of the nose was edematous and usually bathed in mucus. During the latter stages mucus discharged freely from the nose. The mucous membrane of the trachea was edematous, being more or less filled with clear, though more frequently with bloody fluid. In almost every instance the lungs were edematous and ecchymosed, the edema and ecchymosis being most marked in the bases, diminishing over other portions. The ecchymosis varied in intensity. In some instances the bases were extremely dark, soggy, heavy, and when fragments were thrown into the water they floated very low. On incising them, quantities of frothy, bloody fluid escaped, but in some the fluid was quite clear. Frequently fluid was found in the pleural cavity. This fluid in many instances was bloody.

Alimentary Tract.—The mucous membrane of the mouth was thickened and edematous, and there was a free discharge consisting of a mixture of a watery fluid and mucus. In some instances there was a free discharge of fluid which probably came from the stomach. The pharynx, esophagus and stomach were edematous, the mucous membrane being especially thickened. The stomach in every instance was much distended with watery fluid, its wall was considerably thickened, and usually the mucous membrane and the serous surfaces were pale, though more frequently white. The wall was so edematous that on incising it its histological layers were to a considerable extent separated and watery fluid oozed from its cut surface. The cavity of the stomach was more or less filled with watery fluid.

The small intestines were white, their walls much thickened and edematous. On incising them the histological layers were well separated and fluid oozed from the cut surface. In almost every instance their lumen was filled with watery fluid. The large intestine presented like conditions, though decreasing toward the anus. There was free fluid in the peritoneal cavity, in some instances a large quantity. In many of the experiments the intestines and stomach were so filled with fluid that it escaped from both the anus and the mouth.

Liver.—The liver in most instances was hard and greatly enlarged. On making incisions, large quantities of diluted blood escaped, at times spurting. Even when the incision was made at one point the entire liver decreased in size *pari passu* with the flow, and the hardness disappeared.

Gall-Bladder.—The gall-bladder was usually filled with bile.

Spleen.—The spleen usually contained more fluid than normal.

Pancreas.—The pancreas was in most instances enlarged and edematous.

Urinary Tract.—The kidneys were but slightly enlarged; on incising them considerable pale fluid escaped, especially from the pelvis. Occasionally there was ecchymosis underneath the capsule. The ureters were somewhat enlarged. When the experiment was continued for a length of time the urinary bladder was usually extremely distended, but its walls were not edematous. In shorter experiments there was no distention.

EXPERIMENTS IN WHICH THE ABDOMINAL AORTA, INCLUDING THE SPANCHNIC ARTERIES, OR IN WHICH THE LATTER ALONE, WERE CLOSED.

In this series of experiments, in which either the abdominal aorta or at least some of the splanchnic vessels were closed before the saline solution was allowed to flow, death ensued before an equal relative amount of the solution had been given; that is to say, the normal dog could take much more saline than an animal whose splanchnic area had been excluded by closing the supplying vessels. Pulmonary edema developed. The animals died of respiratory failure, the blood usually became cyanotic. In most cases the heart showed the effect of asphyxia by beating more slowly, but very strongly. The circulatory phenomena were virtually the same as in the experiments in which the aorta and the splanchnic vessels had not been clamped. Respiratory failure occurred first. On making blood-counts it was found that in the cases in which the splanchnic circulation had been modified or arrested by clamping one or more of the supplying vessels the number of red blood-cells was strikingly diminished. This was in marked contrast with the moderate change occurring in the experiments in which such exclusion had not been made.

At the autopsies in this series of experiments no

alterations were found in the abdominal viscera. There was no free fluid in the abdominal cavity. Usually the intestines were cyanotic. The stomach, when its blood-supply had been excluded, remained normal, but it was noted in these cases that there was in the stomach and in the intestines a peculiar dark, bloody, gelatinous fluid which adhered closely to the mucous membrane. The walls of the hollow viscera were not thickened as in the other experiments. In comparison with the fore extremities, the hind were quite dry. The heart was pale, the pericardium containing some fluid. The heart stopped in diastole;

irregularity was noted in the change of the blood-pressure; in some instances there was but a slight rise, in others considerable. In the same experiment, at different times, the rise in the blood-pressure might not be equal to that produced by an elevation made earlier or later; that is to say, there was no direct ratio between the elevation and the rise in the blood-pressure, neither was there any ratio between the rise and the amount of saline the dog had received previous to the elevation of the bottle.

Some Drug and Other Effects.—After a con-

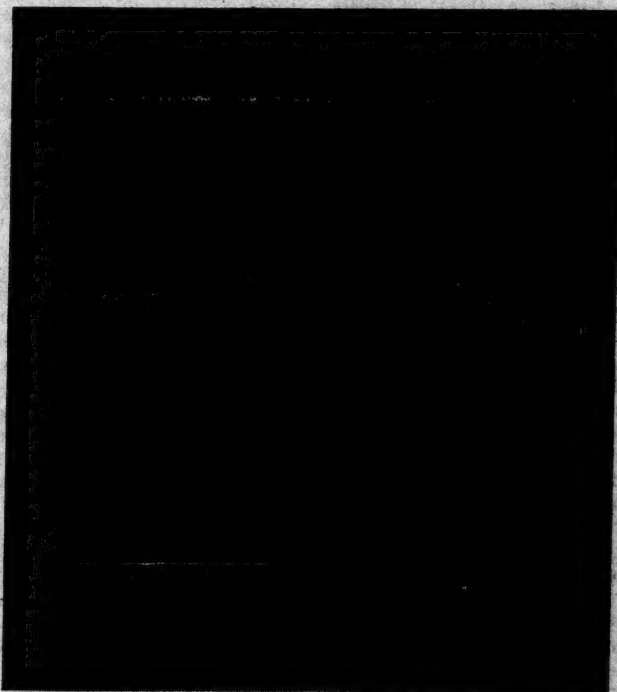


Fig. 3—*a*, respiration; *b*, blood-pressure; *c*, signal; *d*, seconds. Note the diminished rate and the increased length of stroke following the infusion of saline solution at 0°C. On cessation the blood-pressure rose above the previous level, finally taking about the former level. After infusion at 64° C., there was an immediate fall, with temporarily slowed beat and elongated stroke, after which there was a rapid rise, short strokes, followed by a compensatory fall to the previous level.

the chambers were filled with diluted blood and there was considerable pressure in the aorta. In almost every instance the lungs were extremely edematous, much more so than in the experiments in which splanchnic blood-supply had not been excluded. Death in every instance was due to asphyxia, as in the first series.

Effect of the Varying Height of the Saline Column.—A series of experiments was made upon the effect of allowing the solution to flow from different heights. It was found that increasing the height of the bottle but slightly increased the blood-pressure. Great

siderable amount of saline had been infused, the inhalation of chloroform, even in small dosage, produced a very marked depression on the circulation. Upon the administration of strychnine or nitroglycerin their usual physiological action was noted, though to a lesser degree.

Thermal, electrical and mechanical stimulation produced the usual effects. Burning or crushing the paw caused a rise in the blood-pressure and an increase in the respiratory rhythm, manipulation of the larynx, a reflex inhibition of the respiration and the heart, etc.

Effect of Varying Temperature, etc.—No mat-

ter what the temperature, the effects were eventually about the same. When the solution was cold, the heart beats were diminished and the strokes became longer. Frequently at the beginning there would be a fall in the blood-pressure, after which the usual rise observed in all saline infusions would occur. If the lost pressure was not regained during the flow, it was immediately regained on cessation of flow, with a return to the previous rapidity and length of strokes. Hot saline produced the opposite effect, *vis.*, an increase in the rapidity and a diminution of the length of the strokes, with a rise in the pressure. On cessation of the infusion the strokes would resume their former rate and length and the blood-pressure would fall to its previous level. The results were ultimately about equal. Even extreme variation in the temperatures of the solution produced but minor alterations in the temperature of the body. The effects of saline infusion were almost wholly mechanical and physical; within a reasonable range they were independent of variation in the temperature, the rate of flow, the height above the animal, and the vein into which it was introduced. The mechanical factor consists in adding the force of the infusion to the force of the venous blood-stream, which raises the venous blood-pressure, thus increasing the output of the heart. The amount of the output has been proved to be dependent upon the venous blood-pressure.

One of the reasons why the infusion did not raise the pressure indefinitely was the escape of the solution from the circulation at a rate corresponding to the rate of the infusion. The escape occurred principally through the structures that normally absorb fluids, *vis.*, the gastrointestinal tract, to a much less extent through the mouth and respiratory tract and still less into the tissues of the somatic area. The rate of escape of the saline solution through these channels almost equaled any rate of introduction we were able to devise. This was substantiated by numerous blood-counts, showing that after a certain dilution had been reached the count remained about the same. A secondary increase of blood-corpuscles was shown, although an enormous amount of saline was introduced during the observations, but in the experiments in which the splanchnic area had been previously excluded, by closing the splanchnic vessels, the dilution increased *pari passu* with the flow, strikingly diminishing the number of red blood-corpuscles. In these cases, the bronchopulmonary tract eliminated larger quantities than it did in the experiments in which the "leaky" gastrointestinal tract had not been excluded.

It might be supposed that in the experiments in which the great channel of elimination—the gastro-intestinal tract—had been excluded by closing the supplying vessels, the blood-pressure would be raised higher than in the other experiments, but this was not observed. Neither was it found that the administration of an excessive amount of saline materially interfered with the

response of the heart or the vasomotor mechanism to stimuli, as proved by the reflex inhibition from laryngeal manipulation, or crushing and burning the paws, by the administration of strychnine and nitroglycerin as well as by the compensation that occurred on tilting the board.

Conclusions.—The foregoing applies to the normal dog under surgical anesthesia. In experiments in which the blood-pressure had been lowered by a reasonable hemorrhage alone, saline infusion promptly restored the lost pressure. If the pressure had been lowered by the exhaustion of the vasomotor nervous system by afferent impulses set up by an injury of the cerebrospinal or the sympathetic nervous system, the infusion would restore the pressure in proportion to the vasomotor exhaustion; that is to say, normal saline solution is effectual in shock in proportion to the impairment of the vasomotor mechanism. If this mechanism has gone into resolution, infusion is without curative effect. If the impairment is considerable, the infusion will partially restore the pressure, etc. Taking into consideration all the facts, the reason why the blood-pressure is raised but little, if at all, higher than the normal is due to the rapid escape of the fluid from the vessels and the action of the automatic mechanism in the medulla, which when the pressure rises above the normal diminishes the force and the frequency of the heart beats and lessens the vasoconstriction in the area of peripheral resistance, reducing the pressure to the normal level. The peripheral resistance determines the height of the blood-pressure, no matter how swift the stream nor how great the volume of blood. The limitations of the effect of normal saline infusion must now be apparent. If the peripheral resistance is lost (breakdown of the vasomotor mechanism; that is to say, fatal "shock"), no amount of infusion can do more than temporarily and but partially restore the blood-pressure and death is inevitable. If the shock is much increased by regional accumulation of blood (so-called intravascular hemorrhage), as in operations on the splanchnic area, infusion may be effective because the peripheral resistance is still present; that is to say, the vasomotor mechanism has not gone into resolution. If hemorrhage complicates shock and the vasomotor mechanism is still intact, infusion is effectual. Such propositions may be multiplied.

The foregoing deductions explain why certain cases of shock are frequently but little, if at all, benefited by saline infusion. It is true that in almost every case an artificial pulse may be produced, even a pulse of considerable volume, but it is without resistance. It will disappear almost as quickly as it came, and no amount of infusion will sustain the circulation in such a case because the vasomotor mechanism has gone into resolution, destroying peripheral resistance; hence no blood-pressure can be created.

Illustrative Case.—Brakeman, aged twenty-five years, in previous normal health, as proved at

autopsy. Was thrown under the trucks of a railway carriage, losing both legs above the knees. There was considerable hemorrhage. *Circulation:* Pulse 152, small volume, rhythmic, slight tension. Nails bluish; small superficial veins of chest and abdomen prominent; blood-vessels of the lips and face distended and of venous color, giving a cyanotic pallor; pulsation in the neck marked, indicating toneless vessels; surface moist and cold, presenting bluish tinge. *Respiration:* Rate 39; inspiratory phase quickened and shortened; expiratory phase, relatively lengthened; pause increased; extraordinary muscles in light action; slight rhythmic movement of the larynx and alae nae. *Nervous system:* Mind clear and alert; special senses acute; complains but little of pain; is restless and begs for water.

Discussion of the Physiological State.—The massive mechanical irritation and exposure of the nerve-endings and nerve-trunks produced an excessive action of the vasomotor and cardiac centers, especially the former, leading to exhaustion. Proportionately to the degree of exhaustion, the "peripheral resistance" is diminished. Proportionately to the diminution of peripheral resistance the general blood-pressure is lowered and the venous return diminished. Proportionately to the diminution of the venous return the output of the heart is diminished, and proportionately to the diminished output of the heart the volume of the pulse and the general blood-pressure is diminished. This "toneless" state of the vascular system, then, is mainly due to the loss of the "peripheral resistance," which in turn is due to the exhaustion of the vasomotor mechanism, which is due to the excessive stimulation, owing to massive mechanical irritation of the nerve-supply of the lower extremities, by the wheel of a car. In this toneless state the larger arterial trunks are relatively empty so that the blood thrown into the arterial trunks with each contraction of the heart produced a high but short wave, accounting for the marked pulsation in the arteries of the neck; the wave, then, when it reaches the extremities (e.g., radial pulse) is proportionately diminished, is abrupt in ascent, is not sustained, and has proportionately lost its resistance. The capillary circulation is correspondingly diminished, producing the pallor which, together with the loss of heat by perspiration, produces the cooling of the skin. The diminution of the capillary pressure proportionately lessens the venous flow, thereby causing an accumulation of blood upon the venous side, which accounts for the prominence of the small superficial veins and the bluish tinge of the skin, "cyanotic pallor." The blood-pressure is diminished and the heart beat is increased in frequency. (There are many important questions that this discussion has opened, but as they are not pertinent to our present inquiry they will not be discussed.)

The respiration is increased in frequency in accordance with a well-known law governing its automatic centre, *vis.*, the diminution of oxygen

in the blood causes an increased respiratory action, and when the blood reaches a certain degree of cyanosis the extraordinary muscles of respiration are brought into action whether obstruction is or is not present. There being no obstruction present and the extraordinary muscles having no resistance to overcome, their work is so light as to give but little evidence of their action, the inauguration of their action being rather an indication of the degree of cyanosis which, in turn, indicates the degree of circulatory failure. The amount of blood under these conditions actually circulating through the lungs is proportionately diminished, which would be in effect a hemorrhage—an intravascular hemorrhage. The effect upon the respiratory mechanism is essentially the same as in an actual external hemorrhage. Owing to the diminished nutrition and excessive action the respiratory mechanism becomes fatigued, the earlier indications being an increased pause and a quickened inspiratory phase.

During twenty minutes 2,000 cubic centimeters of normal saline solution at 100° F. was infused into the median basilic vein. (Other features of the case will not be discussed.) The pulse was reduced in frequency to 124. The volume was fully as large as normal, the ascent of the wave was abrupt, the fall equally so. The tension remained low. The patient perspired freely and was less restless. Cyanosis diminished. Superficial veins remained about the same. Pulsations at the neck were more marked than before. The patient was not so restless. There was an improvement in most of the symptoms, but what of the vasomotor mechanism? The ascent and descent of the wave was as sharp as before. There was an enormous increase in the volume but only a slight increase in tension.

These several phenomena show that the vasomotor impairment and impending break-down still existed. Though a large pulse was artificially created, the patient's chances for recovery were virtually what they were before. The effects of the saline solution gradually passed away, and an hour later another saline infusion of 1,500 c.c. was slowly given. This time the effects were not so marked and were less sustained than in the preceding. All of the symptoms rapidly grew worse and the patient died at the end of four hours. After the first infusion had been given, oxygen was administered; during its administration respirations were diminished in frequency and the cyanosis was lessened. The participation of the extraordinary muscles of respiration was diminished.

This discussion has been extended for the purpose of defining a well-marked and fairly-characteristic group in which saline infusion is of but temporary aid and in which it does not alter the essential conditions present. The vasomotor break-down is an impairment that cannot be relieved by saline infusion. Drugs are equally ineffective in these cases for the same reason that, although the heart may be stimulated, there being

no peripheral resistance, no blood-pressure (pulse) can be created and death is inevitable. Drugs having action upon the vasomotor mechanism are equally powerless, because, this mechanism having become exhausted, it cannot respond. This also gives a clear reason for the benefits of infusion in cases of hemorrhage alone or hemorrhage with shock, by restoring the normal volume of fluid and adding force to the venous stream.

In shock (vasomotor impairment, *i.e.*, lowered peripheral resistance) the benefit is due to the force added to the venous circulation. The venous pressure falls *pari passu* with the diminution of the peripheral resistance (vasomotor impairment, shock), so that the saline infusion supplies to the venous blood-pressure force which the decreasing peripheral resistance does not ordinarily supply. It must be borne in mind that the output of the heart is wholly dependent upon the venous pressure; that is to say, the infusion may merely tide over a circulatory crisis during which other means for restoring the circulatory equilibrium and tone must be employed. In cases of dangerous hemorrhage the combination of oxygen inhalation with infusion is beneficial, because the reduction in the number of corpuscles so diminishes the amount of oxygen carried that it should be supplied in concentrated form, which by virtue of the law of diffusion of gases increases the volume's percentage of oxygen in the blood.

THE RIGHT AND WRONG USE OF DIGITALIS BASED ON CARDIAC PATHOLOGY.

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If we are to understand thoroughly the action of a drug we must first clearly comprehend the pathological process that we are attempting to assist Nature to modify. This is especially true in connection with the heart and the therapeutic management of this organ when the seat of disease. It seems to me that we have too often lost sight of the physiology and pathology of this important organ in the application of our therapeutic remedies. We have too often regarded the heart purely as a mechanical pump and have thus lost sight of the most important factor, the law governing its nutrition. This law of nutrition, which it is always well to keep clearly in mind in connection with the treatment of all pathological process, is that nutritive interchange between the constituents of the blood and the protoplasm outside the blood-vessels occurs only during the passage of the blood through the arterial capillaries. When the arterioles are highly contracted the arterial capillaries are also in a state of high tension; the blood is driven rapidly over into the intermediate and venous capillaries, where nutritive interchange ceases, and little or no time occurs for nutritive interchange in the arterial capillaries; hence death local or general speedily

ensues. When the arterioles are moderately expanded the arterial capillaries are in a state of physiological low tension and nutritive interchange between the blood-stream and the surrounding structures is at the maximum physiological point. By a rise and fall in the tension and an increase or decrease in the speed of the blood through these arterial capillaries, the nutrition is augmented and depressed in accord with the natural demands upon the protoplasmic elements outside the blood-vessels. Augment the tension beyond a certain point and nutrition will fall below the physiological standard; atrophy and death will follow if this high tension be unduly prolonged. Depress the tension and speed of the blood slightly below the physiological limit and we have hypernutrition. If the augmented nutrition is distributed chiefly to the higher cells, as the muscle—for instance, in the heart—we have hypertrophy; if to the lower cells or the connective tissue binding the higher cells together we have a sclerotic condition or that which has been erroneously termed interstitial inflammation, for both are non-inflammatory processes. If on the other hand the tension is still further reduced, a condition of partial stasis occurs and this in turn will arrest nutritive interchange. Thus we find that too high and too low tension in the arterioles and arterial capillaries will arrest nutritive interchange. Between these two extremes we have slightly augmented and depressed tension, the former causing atrophy and the latter multiplication of the proteid constituents outside the blood-stream or hypertrophy. Between these two intermediate points there is the normal rise and fall in the tension and speed of the blood, which when not exceeded gives the normal physiological state and the tissues or organs remain normal.

With this brief review of the vascular law governing nutrition we can better understand the pathology of the heart and the action of therapeutic agents and especially the right and wrong use of that often misused drug, digitalis.

Let us begin our consideration of the pathology of the heart by a study of that lesion commonly but inappropriately called myocarditis. This term, like many others terminating in "itis," is made to cover a multiplicity of conditions in which none of the true and typical phenomena of inflammation is present, hence the misuse of the term myocarditis. Because a term is improperly used is no ground for its displacement from our nomenclature. On the other hand, it should be retained, but restricted in its meaning to one condition, which is that in which the true phenomena of inflammation is present. Myocarditis should be limited to that condition in which, by some extrinsic or intrinsic cause, an injury is brought to bear upon the capillary vessels in the muscular substance of the heart—an injury which is sufficiently great to destroy the normal functional activity of these vessels. Following such injury there is a temporary spasmodic contraction of the vessels, which is followed by progressive dilatation with partial or complete stasis, a

migration of the white blood-cells from the lumen of the blood-vessels into the perivascular spaces, and an exudation of all the constituents of the blood into these same extra-vascular spaces. When all these changes occur, then we have a condition deserving the name myocarditis, and it is only in such instances that the term should be used. Such a condition may be brought about by an extension of an inflammatory process which originated, for instance, in the pericardium. In fact, with every active pericarditis there is a moderate involvement by the same inflammatory process of the muscular structures directly underneath. If this extension be at all great, death speedily ensues. The muscular tissue of the heart is occasionally the seat of a true inflammation in connection with a pyemic or septicemic condition. In the former instance, multiple abscess may be found in the heart substance. True inflammation of the heart, no matter how caused, is exceedingly rare, and ends, in a few days, by death of the patient so afflicted.

When we come to the consideration of hyper-nutritive conditions, and retrograde changes in the muscle fibers, then an entirely different problem confronts us. These are changes that should never be classed under the term inflammation. To understand these retrograde processes clearly, we must have an accurate conception of the normal nutritive activity, not only of the heart muscle, but of all muscular tissue. All protoplasmic nutritive activity consists in an isomeric transmutation of the proteid molecules with an increasing or decreasing multiplication of these molecules in the substance of the various tissues of the body. If there is a mechanical multiplication of the proteid molecules in a muscle fiber, for instance, we have the plus side of physiological activity, as Virchow has expressed it, to deal with. On the other hand, if there is a progressive decrease in their number we have the minus side. This absorption from the blood into the muscle fiber, with an isomeric change in the molecules and their discharge from the muscle substance into the lymph-stream, is unquestionably the chemical phenomenon that constitutes our muscular contraction. If for any reason the proteid molecules be taken up into the muscle more rapidly than they are isomerically transformed and discharged therefrom, and provided this process is not carried too far, we have the condition known as the plus side or physiological hypertrophy. On the other hand, if the proteid molecules be discharged from the muscle fibers more rapidly than they are introduced, we have the minus side of physiological activity, or the condition sometimes called physiological atrophy. Carry either one of these phenomena beyond a certain limit, and the process becomes a pathological one.

By this same law of isomeric transformation, with an increasing or decreasing number of proteid molecules in the muscle fibers, we can easily appreciate how the muscle may be changed from its normal integrity to one having a mucoid, hyaline or granular consistence until, finally, it be-

comes absolutely pathological in its isomeric or chemical composition. Prior to this pathological change, the proteid elements contained in the muscle fibers resist the absorption of oxygen from the blood into their substance, and hence oxidation reduction of the proteid molecules in the muscle substance never occurs normally, the change in the proteid elements forming the muscle structures being confined absolutely to that of isomeric transformation. When for any reason the isomerism deviates from the normal and causes the proteid elements within the muscle to assume a pathological condition, then their chemical state is changed until it resembles that of the protoplasmic masses in which oxidation reduction is known to take place normally, as, for instance, in the hepatic and renal cells. This pathological condition having been reached by the law of vicarious action, oxygen is drawn into the substance of the muscle fiber and then directly attacks the abnormal proteid molecules in the muscles, causing them to undergo oxidation reduction. In some instances the oxidation results in the formation of pigment matter, which is produced directly from the splitting up of the proteid molecules in a manner similar to the formation of bilirubin and biliverdin in the liver by the oxidation of the proteid molecules in the hepatic cells. In other instances it is attended with the formation of fat molecules as a product of this imperfect and vicarious oxidation of the proteid molecule in the heart muscle. The peculiar granular changes sometimes observed in the heart muscle may be due to one of two changes: irregular isomeric transformation of the proteid molecules with an increasing or decreasing number of molecules, but without oxidation; or it may be due to this vicarious oxidation with the formation of oxidation reduction products, which may be colored pigment particles or minute fat molecules. In the former instance, there may be a complete and rapid restoration of the muscle fibers to their normal condition; in the latter, it is doubtful if complete restoration can ever be brought about. It certainly cannot if the fatty degeneration be at all extensive, thus impairing greatly the nutritive integrity of the proteid structures. With a decrease in the number of the proteid molecules or an oxidation reduction of the proteid elements, there is a decrease in the volumetric space occupied by the muscle; this allows a larger volume of blood to flow in between the muscle fibers than normally occurs. This will cause a plus nutritive activity of the simple connective tissue cells between the muscle fibers. When this occurs, there is an increase in the cells and fibers that constitute the connective tissue between the muscle fibers, and that condition is produced which is inaccurately called a chronic interstitial inflammation of the heart, or chronic myocarditis. Strictly speaking, it is a chronic sclerosis of the heart, and in no sense an inflammatory process. It is the result of the battle constantly going on in the animal economy between the higher or noble cells and the lower or ignoble cells, which is most ac-

curately described as follows by Metschnikoff, in his admirable article entitled "What is Old Age?" (*St. Petersburg. Novosti*).

According to Metschnikoff, "Every organ of our body is composed of two kinds of cells—common, and, as it were, noble cells. The noble cells determine the peculiar functions of the organs. . . . The common cells do not differ from one another, they are identical in all the organs, and their only function is to connect and hold together the noble cells.

"Between these two kinds of cells there goes on an incessant struggle. The noble cells are stronger, and for a long time they prevail; *i. e.*, they successfully resist. But eventually the struggle exhausts them, and the preponderance passes to the common cells. This signalizes the beginning of old age. The noble cells are crowded more and more, the common ones growing in size at their expense and interfering with the functions of the organ. Hence the abnormal diseased appearance of the organs, and the increasing difficulties in the way of living. Ultimately the performance of the functions becomes entirely impossible, and we have death."

Metschnikoff gives the term *macrophagi* to the connective-tissue cells, while the noble cells—epithelia and leucocytes—he calls *microphagi*.

This is but a modification of the theory in reference to histological changes in Bright's disease advanced by Weigert in 1879, and accepted by Cohnheim and C. Wagner, which is to the effect that connective-tissue proliferation is, in most cases, secondary to and excited by destruction (degeneration) of the renal epithelial elements.

When we are dealing with the heart, the muscle fibers represent the noble or special functioning cells, while those constituting the intermuscular structures represent the ignoble or connecting cells.

When we have an overfilling of the muscle fibers with proteid molecules (cloudy swelling) as the primary change, the intermuscular structures are abnormally compressed and their nutritive supply is decreased. This causes a minus nutritive condition of the structures between the muscles and an atrophic condition of the intermuscular planes. This is the condition of the overtrained athlete's heart. Hence the frequent and sudden deaths so often witnessed in this class of cases, when the overnourished muscle fibers which are associated with an atrophied state of the intermuscular planes begin to undergo retrograde changes.

In my opinion, it is these chemico-pathological changes in the muscle fibers, with an impairment in the nutritive activity of the nerves distributed to the heart, that cause the painful symptoms so commonly known under the name angina pectoris, all of which may occur without any macroscopical changes in the coronary arteries, and probably do occur in the majority of instances without marked lesions in these arteries. The statistics given by Dr. Satterthwaite¹ show that so far

as necropsy findings are recorded a majority of the cases of angina pectoris do not have perceptible lesions of the coronary arteries alone. The two conditions may be found together, but the one is not necessarily dependent upon the other.

Another question is as to whether hypertrophy of the heart precedes or follows arteriosclerosis. It seems to me that this question can be answered in only one way: hypertrophy of the heart must always follow and never precede or act as an etiological factor in producing arteriosclerosis. The vascular tension may be augmented or depressed as the result of an intestinal putrefactive fermentation with a toxic infection of the system. The toxic products may be of such a nature that they will stimulate the primary vasomotor centers in the medulla and cause a general high tension; or, on the other hand, they will depress the nerve centers and cause low tension. If the former condition is prolonged for any length of time, together with active muscular exercise, there may be a plus nutritive activity in the heart to overcome the arterial resistance. If this condition should continue for any length of time, which is highly improbable, then a hypertrophy of the heart, so called, might appear, to the casual observer, to precede a sclerosed condition of the vessels; still the hypertrophy of the heart in this instance has resulted from the high tension of the vessels, and does not act as the etiological factor in producing arteriosclerosis. What more frequently occurs is a depression of the medullary centers, and in consequence thereof a dilatation of the capillary vessels distributed to the vascular walls is produced. This in turn is followed by an augmented nutritive activity both in the muscular or noble cell structures and in the connecting tissue or ignoble cells. As a result of the continuance of this augmented nutritive activity, both in the noble and the ignoble cells constituting the vascular structures, the elasticity of the vascular walls is destroyed by the former giving way to the latter, as already described. This loss of elasticity occurs long before the arteriosclerosis can be appreciated by the clinician. This loss of elasticity means increased resistance to the current of blood and calls for more work on part of the cardiac muscle, and thus there may be produced a certain amount of hypertrophy of the heart muscle prior to the development of the complete arteriosclerosis. The hypertrophy of the cardiac muscle developed in this manner may have led some observers to believe that the hypertrophy preceded and caused the arteriosclerosis. On the other hand, it is clearly apparent to the close observer that the vascular changes, as previously outlined, in all instances antedate and cause the cardiac hypertrophy. In a large proportion of the cases in which the arterioles become sclerosed early in life, it is highly probable that a syphilitic infection is the

¹Tacchi, *Gaz. Med. di Roma*, 1890, vol. xvi., p. 97. Quoted by Satterthwaite, *The Post-Graduate*, New York, 1901, vol. xvi., p. 30.

primary etiological factor in bringing about this condition, and must always be kept in mind in connection with the treatment. Not that syphilis is the sole cause, but it is frequently a potent factor in producing arteriosclerosis. Later in life syphilis is less likely to be the exciting cause: Here it is brought about by the giving up of the struggle by the noble cells as against the ignoble which constitute the walls of the blood-vessels, as outlined by Metschnikoff, that cause the arteriosclerosis and so-called atheromatous changes.

During the pregnant state, or as the result of a reasonable amount of physical exertion, there is every reason to believe that a plus nutritive activity is excited in the cardiac muscle, as occurs in all other muscles under similar conditions. This will naturally cause an increase in the volume of the muscle, and that condition called physiological hypertrophy will be produced. Provided this augmental nutritive activity is not carried too far, when the cause for increased work on the part of the heart is removed the cardiac muscle will return to its previous volumetric condition.

In connection with our valvular lesions the same laws are at work. In the beginning Nature attempts a physiological augmentation of the nutrition of the muscle tissue to counterbalance the mechanical defect in the valve, and in so far as she succeeds, either alone or aided by the judicious administration of remedial agents, the defects in the valves are compensated for.

If, however, for any reason, or as occurs in the heart muscle of the overtrained athlete, or the compensating hypertrophy of valvular lesions, the increased nutritive activity be carried too far, then what might have been only a physiological process will pass into the pathological, and it may be very difficult to bring about a return to the normal state. Still, if the vascular and chemico-physiological laws that govern these physiological and pathological changes are accurately apprehended and our therapeutics is applied in conformity with these laws, the results obtained in some instances are almost miraculous. Hearts that at first examination seem to have passed beyond the point of repair are frequently brought back into a perfect physiological condition and continue to do good work for years. This, however, requires not only the use of remedial agents which act only on the heart and circulation, but equally as great care must be exercised in the dietetic and hygienic management of these cases; otherwise we shall fail to secure the desired results.

With this understanding of the chemico-pathology of the heart and the physiological laws governing its nutrition, the therapeutic action of digitalis can be more accurately interpreted.

To comprehend thoroughly the action of digitalis or of any drug, its chemical composition must be fully understood. At the same time, the laws that govern the action of all chemical compounds introduced into the system must be accurately apprehended and correctly applied to those that are introduced as medicinal agents. When this is accurately done, much new light is let in

upon the action of our remedial agents. In this manner many a drug, so called, has been taken from the speculative and empirical class and transferred to the exact or truly scientific, thus raising the whole field of therapeutics to a higher standard. With digitalis there still appear to be considerable doubt and difference of opinion prevailing in regard to its mode of action, and also as to the therapeutic utility of this drug and its various preparations; some praising it highly while others condemn it vociferously.

Digitalis, like many other vegetable substances, appears to develop in its anabolic growth numerous chemical compounds, all of which are composed of the atomic elements, carbon, hydrogen, and oxygen, in varying proportions. This particular group of compounds has been classed as glucosides in contradistinction to those containing nitrogen, and which are, in consequence, known as alkaloids. The glucosides which have thus far been isolated and identified in connection with digitalis are digitalein, $C_{42}H_{60}O_{18}$; digitoxin, $C_{41}H_{62}O_{17}$; digitonin, $C_{41}H_{62}O_{17}$; digitalin, $C_8H_{10}O_2$; digitin, $(C_8H_{10}O_2)_n$. Exception is taken, however, to digitoxin as a glucoside; still, in atomic construction it is very similar to the four which are classed as true glucosides. Why the digitoxin is excepted is not clearly stated, but it is probably due to the fact that when boiled with a dilute acid it does not yield glucose, which is the critical test for those substances designated as glucosides. Whether it be a glucoside or otherwise makes little difference so far as the chemical problem is concerned, for they are all composed of the same class of atomic elements, and being composed of the same class of chemical elements they are all amenable to the same chemical laws; all are oxidizable substances and they all yield the same products as the result of their oxidation-reduction, *vis.*, heat, carbon dioxide, and water. Owing to the varying proportions of these atomic elements, the amount of oxygen required to reduce each one will vary, as will likewise the amount of heat generated, both in amount and in the intensity of its action upon the various portions of the nervous mechanism. Of the five chemical compounds contained in the digitalis, four are said to influence the animal economy actively, while one, digitin, appears to be absolutely inert. Of the remaining four, three have actions in common, while the fourth absolutely antagonizes the other three.

Beginning our study of the action of digitalis with the powder, which is the simplest preparation to use, and one which does not involve the question of varying solubilities of the contained active ingredients, its action can be pretty closely analyzed. When this preparation is used there is introduced into the animal economy a substance containing chemical compounds capable of being oxidized, and, on the whole, it has a decided tendency to paralyze all the involuntary muscles.

So far as the nervous system is concerned, it is generally conceded that none of the active principles has any pronounced primary effects, yet, on

the other hand, acting indirectly through the nervous mechanism or directly upon the heart itself, the contained active principles do not produce profound changes in the action of the heart and in the circulation.

Acting directly upon the heart, or through its nervous mechanism, the three active principles which have a similar action cause a more intense and shorter systolic contraction with a prolonged diastolic period. Synchronous with this effect upon the heart there is a marked contraction of the arterioles and a very pronounced rise in the blood-pressure. Following immediately upon these effects there is, at first, a marked decrease in the number of cardiac pulsations to the minute, which by some is said to be due to the direct depressing effect upon spinal accessory fibers distributed to the heart. A better explanation for the reduced speed of the heart is to attribute it to the increased resistance to the blood-stream in the arteries. This, coupled with the depressing effect of the digitonin upon the muscle fibers, easily explains the decreasing number of pulsations to the minute.

If the digitalis is continued the pulsations become more frequent and feeble, which is readily explained by the toxic effect of all the active principles of digitalis upon all the involuntary muscles. The continued high tension in the arterial system tends also to deprive the cardiac muscles of their requisite nutrition. Thus, we find that at first the heart is called upon to do more work by the action of a substance that is all the time poisoning the muscle fibers, and, at the same time, its nutrition is being progressively cut off by the increasing high tension in the arterial system. A little later the toxic effects of the active principles of the digitalis begin to be felt in the muscle fibers of the arterioles; the tension relaxes, the heart becomes more feeble and irregular, and death ensues in diastole. While a very large dose of digitalis may cause a complete cessation of the heart's action in profound systole, the usual mode of death is as above described.

While the general arterial system is in a state of high tension, that of the splenic arcade remains normal, or is slightly lowered, unless an enormous dose has been administered; then, the latter, as well as the former, becomes contracted; however, this is a very rare occurrence. This, then, briefly stated, is the sum of the effects that can be produced upon the heart and circulation by the internal administration of digitalis and its varying preparations.

With the liquid preparations these statements have to be somewhat modified. Especially is this true with the infusion, for the simple reason that two of the active principles, digitoxin and digitalin, are very little, if at all, soluble in water, so that the infusion contains only digitalein and digitonin. The one directly antagonizes the action of the other, yet both are, in a measure, toxic to the involuntary muscle fiber. In this respect the in-

fusion becomes of comparatively little value, and less damaging in its effects upon the system than the powder.

With the tincture, still another condition obtains. The digitoxin and digitalin are freely soluble in alcohol, while the digitalein is sparingly so, and the digitonin is insoluble. Thus, we find that each preparation of digitalis differs from the other, and cannot be directly compared with it. The fluid extract more closely resembles the powder, it being made by the action of both alcohol and water; this, however, is, in a measure, a very uncertain preparation, for there is no practical method of determining how much of the soluble elements in the water and in the alcohol may be dissolved or precipitated by the presence of the soluble and insoluble menstruum.

With this knowledge of the chemical composition of digitalis and its contained active principles, and the variation in the composition of its preparations, its therapeutic possibilities can be easily worked out.

While digitalis is often spoken of as a cardiac tonic, there is little or nothing known in relation to its action upon the system that will justify such an assumption. Digitalis can be made to slow the action of the heart, but to do this the cardiac muscle is stimulated to do more work; at the same time the intrinsic muscle fibers are being steadily poisoned and the nutritive supply steadily diminished by the increasing high tension. Hence, the recommendation that digitalis must be interrupted every few days to avoid sudden and fatal syncope. At this point it may be well to consider the so-called and much-talked-of cumulative action of digitalis. Careful study and research show that there is little evidence to prove that there is any storing up of digitalis, or its sudden elimination in large quantities; on the contrary, the weight of evidence establishes the fact that the active principles of this drug are rapidly decomposed within the system. A more logical explanation must be sought, and one that accords more closely with the known physiological laws. The cumulative action of digitalis appears to be more directly exerted upon the heart, the kidneys often acting freely even in the presence of the depressed heart action.

By keeping closely to the well-known actions of digitalis and combining these with the physiological laws that govern the nutritive processes of the body, a perfectly rational solution of these so-called cumulative symptoms is developed. Digitalis, as we have already observed, increases primarily the motor force of the heart muscle, thus augmenting the catabolic transformation of the muscular elements. This, in itself, would deteriorate the muscular strength, but digitalis, in addition, is a direct muscle poison, and this is doubly true of the digitonin. While digitalis at first apparently increases the working power of the heart, it increases, at the same time, the resistance offered in front of it, so that the rapidity of action of the heart must be diminished in order to in-

crease its working capacity. Now, physiology teaches that high arterial tension, by increasing the velocity of the blood-current in the arterial and capillary systems, decidedly reduces the time during which the nutritive interchange between the blood and the protoplasmic tissue in the intravascular protoplasmic spaces can be effected. This law applies equally well to the artificially high tension produced by digitalis. We have, therefore, three factors causing the symptoms of digitalis poisoning, *vis.*, (1) the diminished nutritive supply to the cardiac muscle resulting from high arterial tension; (2) the increased work imposed upon the heart, and (3) the action of digitalis *per se* as a decided muscle poison. This seems to the writer to be the first logical explanation offered for the so-called cumulative action of digitalis. There can be but one result of the continued administration of digitalis, degeneration of the muscular fibers constituting the ventricular and auricular walls, particularly the former. The heart action is first slowed to meet the increased demands; then, like every other degenerated heart, the action becomes rapid and feeble and, finally, irregular; or it may stop in diastole on some slight exertion, such as sitting up in bed or rising to pass urine.

If the drug be administered in homeopathic doses, no perceptible deterioration of the heart will be apparent, but when a thoroughly reliable preparation of digitalis is used, and the drug is administered continuously up to the full physiological limit, the heart is invariably damaged, thus explaining the oft-repeated remark that digitalis proves unsatisfactory in permanently alleviating cardiac affections.

In both insufficiency and stenosis of the left auriculo-ventricular orifice, digitalis improves the condition temporarily; in the former instance by more quickly and effectually closing the incompetent orifice. It also intensifies the systolic contraction and more completely empties the contents of the ventricular cavity into the aorta. This having been accomplished, the mechanical action of the heart is improved.

In a similar manner, in mitral stenosis the prolonged diastole, with an intensified contraction of the auricle, enables the latter to fill the ventricle more completely. This, coupled with the more intense systolic contraction, drives a larger volume of blood into the aorta. Thus in both lesions of the mitral orifice the pulmonary congestion is overcome and the dyspnea consequent upon the pulmonary engorgement is removed. If this were the only and the complete action of digitalis it would be an exceedingly valuable remedy. Up to the point of overcoming the decreased arterial tension and the removal of the venous engorgement, the physiological action of the circulation as well as the mechanical action of the heart is greatly improved. Once the normal tension has been reached and passed, the action of the digitalis is detrimental to all the physiological functions of the body, because it increases the work of

the cardiac muscle, poisons the muscle fibers and progressively decreases the nutritive supply distributed to the organ.

In aortic lesions, either in incompetency or stenosis, there seems to be no good reason for using digitalis at any stage. Certain it is that in aortic regurgitation the increased systolic stroke cannot freely compensate for the prolonged diastolic period and longer time during which regurgitation can take place. Added to this are the increasing arterial tension, with its greater resistance in front of the heart, and the progressive cutting down of the nutritive supply to the heart muscles, both of which, or either one alone, would be sufficient to contraindicate the use of digitalis in aortic insufficiency. In aortic stenosis the augmented cardiac systole might for a time force a larger volume of blood into the aorta, thus temporarily improving the condition; but the increased work of the cardiac muscle, together with the poisoning effects of the digitalis upon the muscle fibers, and the progressively diminishing nutrition, will soon be followed by a deterioration of the cardiac muscle and an aggravation instead of an amelioration of the symptoms.

In fatty degeneration, or any enfeebled condition of the heart muscles, digitalis is contraindicated.

In hypertrophy of the heart digitalis might theoretically be useful in cutting down the nutritive supply, thus lessening the tendency to further hypertrophy even if the hypertrophic condition could not be completely removed. Even in this instance, digitalis is too dangerous a remedy to use for such purposes. Digitalis is of service only for a few days at a time at the longest. It should only be given to influence the heart and circulation when the arteries are very much relaxed, and the pulmonary or systemic veins overfilled with blood. In such instances as these it will tighten up the vessels and, by augmenting the power of the systole, will force a larger volume of blood into the arterial system. In this manner the surplus of blood can be pumped, as it were, from the venous system into the arterial. This accomplished, the digitalis should at once be stopped and more reliable remedies used to maintain the heart and circulation. To use digitalis outside of these narrow confines, when there are so many other safer and more reliable remedies, is, to say the least, extremely poor therapeutics.

Some argue that by giving a sufficient amount of nitroglycerin in conjunction with the digitalis the damaging effects of the digitalis can be obviated. In a measure this is true, but it does not altogether diminish the increased work forced upon the heart muscle, neither does it antidote the general toxic effects of digitalis upon the involuntary muscles as a class. While this is better therapeutics than the use of the digitalis alone, it is not the best that can be done for the patient, and nothing short of the best should be the aim of the truly scientific and practical therapist.

OPERATIVE TREATMENT IN CERTAIN SUPPURATIVE CONDITIONS OF THE KIDNEYS.¹

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WITHIN the last decade our observations of and experience in the treatment of the suppurative lesions of the kidney have been increased by an enormous mass of clinical and pathological material. Important advances have been made in the diagnosis of kidney lesions by means of a more intelligent examination of the urine, by the use of the cystoscope and of the ureteral catheter, and by a greatly extended knowledge of the causes of kidney suppuration and of the avenues through which micro-organisms gain an entrance into that organ. Various bold and brilliant operative methods have been devised in the treatment of the kidney and the ureter, and results formerly beyond the bounds of the most sanguine imagination have been obtained.

It will, perhaps, be interesting to consider in a hasty way the modifications which our ideas have undergone in regard to operative treatment in certain of the group of lesions indicated in the title of this paper. Ten years ago the attitude of surgeons was conservative toward these conditions. At present some of us at least believe that a rational boldness may be the best conservatism.

For purposes of consideration we may classify the purulent infections of the kidney into several types: (1) An acute pyelonephritis attended by the formation of multiple foci of suppuration in the parenchyma of the kidney; (2) pyonephrosis, in this the term including those forms of suppuration in which the process is an infectious one from the beginning, involving the substance of the organ and representing often a late stage of the first group; (3) solitary or few abscesses in the kidney, sometimes of a necrotic or gangrenous type, following injury, occurring in the course of acute infectious diseases, pyemia, and as a metastatic process due to the presence of purulent foci in distant parts of the body, but not to be placed in the category of distinctly pyemic infections; (4) cases of suppuration occurring as a secondary process in hydronephrosis. The limits of this article do not permit me to include a consideration of those processes in which tuberculosis or renal calculus must be regarded as the primary cause of the disease.

Pyelonephritis.—A few years ago pyelonephritis in its acute form, attended by the formation of miliary abscesses in the kidney and by grave constitutional symptoms, was regarded as a disease almost uniformly fatal and was treated solely by medical means, or at least upon an expectant plan until, in the event of the continued life of the individual, a large boggy swelling in the loin might be incised for the evacuation of pus. More recent experience would indicate that many of these infections are limited to one kidney, and

that in such cases early operation leads often to the most brilliant results. Consultation of recent literature and personal communications from surgeons of my acquaintance have enabled me to collect several cases of this character. The following surgeons have had cases of this description: Prof. Henri Hartmann of Paris, Dr. Charles McBurney of New York, Dr. Samuel Alexander, also of New York, and the author of this paper.

Prof. James Israel in his recent work, "Surgical Clinic of the Diseases of the Kidney," Berlin, 1901, relates the histories of several cases of kidneys with acute septic infection and numerous miliary abscesses. These cases of nephrectomy for acute pyelonephritis all resulted in complete recovery; their number could no doubt be multiplied by further search. Such results in the treatment of this very fatal disease in its early stages represent a distinct advance in the surgery of the kidney.

It is possible that nephrotomy might have furnished an equal number of recoveries, but these patients were relieved of the septic focus at once; they escaped death from septicemia, from septic nephritis of the other kidney, from all the dangers immediate and remote which not infrequently follow nephrotomy done at a later stage of the disease, and from the very great risk of a secondary nephrectomy often necessary on account of our inability to accomplish a cure without removing the entire organ.

Pyonephrosis.—Incision and drainage have been and still are by many surgeons regarded as the operation of choice in conditions of suppuration within the kidney accompanied by obstruction, complete or partial, to the escape of the pus into the bladder, and characterized by extensive suppuration of the kidney tissue itself, with or without notable dilatation of the pelvis and calyces of the organ. The basis of this opinion rests upon the following assumptions: (1) The operation of nephrotomy has been attended by a lower mortality; (2) nephrotomy does not sacrifice an organ the retention of which in a functionally active state is important to the individual; (3) the sudden removal of one kidney is believed to throw a double duty upon the other, involving the risk that the single kidney may be unequal to the task; (4) it is assumed that the operation is simpler and can be performed in a shorter time, with less danger from prolonged anesthesia, less loss of blood, less risk of subsequent anuria.

In order to determine whether these assumptions are based upon fact, it will be worth while to enumerate the objects to be attained in operations for the cure of pyonephrosis, the conditions found in these cases, the difficulties to be overcome and the means at our disposal for meeting the indications. A pyonephrotic kidney usually consists of an organ in the substance of which purulent collections of greater or less extent are distributed; the calyces are usually dilated and communicate directly with some or all of the ab-

¹ Read before the Genito-Urinary Section of the New Academy of Medicine, 1901.

cess cavities. The pelvis of the kidney, on the other hand, may be greatly dilated or but slightly so. The lumen of the ureter may be completely and permanently obstructed, or the obstruction may be incomplete and of such a character as to be partly or entirely overcome by operative means. The purulent foci in the kidney substance may communicate freely with each other and with the calyces, or may be isolated. The interior of the calyx may communicate with the pelvis of the kidney or it may not. The abscesses may be large or small and may lie in any portion of the organ. The remaining kidney substance, unaffected by suppuration, may be large in amount or there may be none at all. The other kidney is not infrequently the seat of a toxic nephritis dependent upon prolonged septic absorption.

The condition of the individual may be more or less profoundly septic. The indications then are: (1) To relieve the individual from his septic condition and to do this in such a manner as will imperil his life in the smallest degree; (2) to reestablish free communication between the calyces of the kidney and the urinary bladder if that be possible.

Let us consider how well the operation of nephrotomy is calculated to fulfil these indications. It is plain that a simple incision of the organ for the evacuation of pus leaves much to be desired. Under unfavorable conditions such an incision may be all that we dare perform; however, this is not usually the case. Owing to the very complicated character of the cavities to be drained and the unknown extent of the organ affected it is necessary to open widely the kidney. In order to explore the upper pole of the organ, its attachments must be freed so that it may be drawn down from beneath the ribs. This involves an amount of traumatism nearly equal to that necessary in nephrectomy. In order to explore the pelvis of the kidney and ureter, we must search the dilated calyces for an opening into the pelvis of the kidney. The pelvis of the kidney must then be searched with finger and probe for a possibly existent stone and the ureter in turn for a cause of ureteral obstruction. The multiple pus cavities must be reduced to a simple form, as a provision for adequate drainage, and must communicate freely with the external wound and remain easily accessible from without.

In order to accomplish this indication it is usually necessary to cut or break down the septa between the several pus cavities, a procedure often attended by much bleeding in cases in which blood cannot well be spared; moreover, the destruction of these vessels very seriously imperils the nutrition of the remaining kidney substance, already the seat of septic nephritis. This is easily proven when, as often happens, the kidney must be removed at a later period and we examine it to see what portion remains functionally active. We usually find either that the kidney substance remaining is surprisingly small in amount, or that it has disappeared and is repre-

sented by a mass of fatty tissue containing but few kidney elements.

Suppose we have fulfilled all these indications as well as may be, the operation will have lasted as long or longer than though the organ had been removed, probably as much or more blood will have been lost and our patient has still to run the risk of chronic sepsis. Much weight has been placed upon the risk of the sudden removal of one kidney, thereby throwing all the work upon the other; but, apart from the fact that the diseased organ is probably excreting but little urine at the time of its removal, observation shows that after nephrotomy for pus several days may elapse before the incised kidney resumes its function and urine appears in the dressings; that is to say, during the time that anuria is most to be feared, the incised kidney may be almost as useless as no kidney. There is, moreover, much ground for the belief that a greatly diminished blood-pressure and a feeble heart are among the most potent factors in the production of anuria, and that this condition may follow great loss of blood and cardiac weakness as well when two kidneys are present as when there is but one.

The well-known effect of saline infusions upon the excretion of the kidneys after surgical operations of whatever character strongly supports this view. Among 86 operations done upon the kidney in Roosevelt Hospital from 1890 to 1898 there were 13 deaths. In 3 of these cases anuria was a fatal symptom. Once it followed nephrectomy in which congenital deformity of the entire urogenital tract prevented ureteral catheterization. When a kidney was removed in an advanced stage of tuberculosis, the autopsy showed the other kidney to be cystic and entirely devoid of secreting substance. The other two deaths followed nephrotomy, once for hydronephrosis on one side in the presence of chronic diffuse nephritis on the other; in the other after an incision of one kidney for pyonephrosis when a similar condition was present on the other side. The cases of pyonephrosis numbered 20; 7 were treated by primary nephrectomy, with no deaths; complete recovery in each case. To this list I may add 4 cases of my own done at a later period, with one death. The fatal case was one in which, owing to a large pyonephrotic kidney, dense adhesions and inflammatory infiltration of the fatty capsule, intracapsular nephrectomy was impossible. The patient was an elderly woman with a long history of chronic sepsis; she died of shock on the day of the operation. The amount of bleeding was not excessive, and I am willing to regard the removal of this kidney as an error in judgment. Among the remaining 17 Roosevelt Hospital cases 3 were treated by secondary nephrectomy, with one death. In two secondary nephrectomy was attempted and found impracticable. In one case the sinus finally healed; in the other it did not. Ten cases were treated by nephrotomy with 3 deaths. Of the 7 who survived several left the hospital with a sinus, and I have been unable to learn the ultimate result in these cases.

Israel gives the mortality among his cases of primary nephrectomy for pyonephrosis as 23 per cent.; the mortality of secondary nephrectomy for the same condition as 50 per cent.; the mortality of nephrotomy for pyonephrosis as 40 per cent. A cure was obtained by means of conservative operations in his cases of pyonephrosis in but 5.2 per cent. A very large proportion of those cases treated by nephrotomy in the Roosevelt Hospital, although they recovered in so far that the urgent symptoms subsided and they were able to leave the hospital, were not at that time definitely cured; that is to say, a pus sinus or at least a tract from which pus and urine at times escaped remained in the loin, and several of these individuals were obliged to wear a drainage tube to avoid the occurrence of septic symptoms which soon appeared when the drainage tube was omitted.

To those who are practically familiar with the surgery of the kidney it is scarcely necessary for me to refer to the very great difficulties and dangers of secondary nephrectomy in cases of pyonephrosis. Not only are extensive adhesions to the peritoneum quite the rule, rendering infection of the cavity of belly possible, but also the isolation of the pedicle is always difficult, frequently impossible, and is accompanied by a serious risk of wounding the vena cava together with uncertainty of securing the renal artery and vein. Shock in these operations is generally marked. It must then be admitted, I think, that in cases of pyonephrosis, a greater experience would indicate that nephrotomy can hardly be regarded as the operation of choice. In the individual case the question must be decided upon consideration of (1) the general condition of the patient, (2) the condition of the affected kidney and ureter and of the surrounding soft structures, and (3) the condition of the other kidney. Great weakness of the heart, intense anemia, and the other unfavorable accompaniments of profound sepsis, acute and chronic, may render a simple incision for the evacuation of pus the only surgical measure we dare employ. The local conditions may be such that nephrectomy may be impracticable from the start. Such conditions may depend upon extensive inflammatory infiltrations of the perirenal structures; but even in these cases subcapsular nephrectomy may sometimes be accomplished.

In regard to the condition of the other kidney, it should be remembered that a septic nephritis of considerable severity may exist in one kidney without constituting an absolute contraindication to the removal of its fellow. A case described by Prof. Israel proves this. A kidney was removed; it was the seat of intense septic inflammation, with numerous abscesses. A severe grade of nephritis existed in the other kidney at the time of the operation. The signs of nephritis, however, entirely disappeared and the patient regained perfect health.

A similar case has recently come under my observation. A woman of middle age was operated upon by nephrotomy for a tuberculous

kidney with secondary pus infection. The septic symptoms improved but did not disappear, and a pus sinus remained in the loin. At this time the patient came under the care of Dr. Charles McBurney, at whose request I passed a ureteral catheter into the ureter of the non-infected kidney. Examination of the urine showed nephritis of a fairly severe type. The urine obtained was of low specific gravity and contained a good deal of albumin, together with granular and hyaline casts. The general condition of the patient was not very favorable as she was anemic and feeble. Dr. McBurney removed the right kidney. The specimen showed an advanced stage of tuberculosis with a secondary pus infection. The patient made a satisfactory convalescence and at the present time, less than a year after the operation, she enjoys a degree of health which may fairly be called robust. The signs of nephritis in the urine furnished by the remaining kidney have disappeared, except that from time to time a minute trace of albumin has been detected. There are no casts.

These and similar observations teach us that the condition of the urine does not furnish an absolute measure of the capabilities of a disordered kidney to carry on its function, if we are able by the removal of its fellow to eliminate the cause of its faulty action. Many cases might be quoted in which an apparently severe nephritis caused by chronic suppuration in any part of the body has entirely disappeared after the septic focus has been removed by operation.

Kidney Abscess.—In cases in which a limited portion only is the seat of suppuration, following injury to the organ or occurring by hematogenous infection in the presence of distant pus foci (in cases of furunculosis, for example), in a few cases of pyemic abscesses in the kidney and in those cases of acute pyelonephritis with the production of miliary abscesses limited to a comparatively small portion of the parenchyma, brilliant results have recently been obtained by various operators by excision of the diseased portion of the kidney. Five cases of this kind have been published by Lenander, four of the patients recovering completely, while the fifth died.

The author draws the following conclusions:

1. Acute pyelonephritis with miliary abscesses is more often a unilateral disease than has been supposed.

2. The changes are often not extensive in the diseased organ, so that a great part of the kidney can be saved and its natural function restored.

The local conditions in these several forms of kidney suppuration are far less complicated than is the case in pyonephrosis and the indications may more often be fulfilled by a conservative operation.

Infected Hydronephrosis.—Originally an obstructive condition, non-infectious in character, leading to dilatation of the pelvis and calyces and later to atrophy of the kidney itself, if unrelieved and accompanied by compensatory hypertrophy

of the sound kidney, infected hydronephrosis is frequently curable by a conservative operation if done in time. The operative treatment after infection of the interior of the sac has occurred presents to us problems in part more complicated, in part less so, than is the case in original pyonephrosis.

The patient can be relieved of septic absorption by incision and drainage in a safe and satisfactory manner. The pus cavity is usually a single large sac. Since these cases are usually more or less chronic in character, the cystic mass is surrounded by a dense layer of connective tissue through which septic absorption does not readily take place. If the kidney is still capable of functional activity, drainage may so far eliminate the formation of pus that the interior of the sac finally becomes aseptic, and a subsequent operation, not necessarily grave in character, may be done to reestablish the communication between the pelvis of the kidney and the bladder. Such an operation may consist of the extraction of a stone, the incision or dilatation of a stricture, of a plastic operation upon the dilated pelvis or ureter, as a result of which the opening of the pelvis into the ureter becomes the most dependent point and the urine by gravity seeks its proper channel. In the event of failure a secondary nephrectomy is rather less dangerous than is the case with pyonephrosis. A much larger proportion of these cases are cured by conservative operations, 37.5 per cent. as compared with 5.2 per cent. in pyonephrosis. When nephrectomy is necessary the kidney has, as a rule, long ceased to functionate. No additional work, therefore, is thrown upon the other kidney. Nephrotomy, however, is to be regarded as the operation of choice.

ON THE TECHNIC OF CYSTOSCOPY IN THE FEMALE.

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SINCE Nitze's perfection of the cystoscope gave us a means of obtaining the greatest possible degree of certainty in the diagnosis of pathological vesical conditions, and since Winter, Kolischer, Viertel and others applied it and its modifications to the examination of the female bladder, there has been much difference of opinion among cystoscopists as to the difficulties accompanying its proper application. One hears, on the one hand, that it is ridiculously easy when compared with cystoscopy in the male, while the other side is inclined to magnify its difficulties. Personal experience, covering something over one thousand cystoscopic examinations in both sexes, leads me to agree fully with Casper's view. He says: "With reference to the insertion of the cystoscope, the technic is easier in the female than in the male, since the difficulty of passing it through so long and curved an organ falls away. But inside the female bladder the examination is more difficult." If we had, in all cases, to deal with a bladder of

normal contour, this difficulty would fall away; but the pelvic organs of the women who seek the aid of the gynecologist or urologist are seldom normal, and so we find the lumen of the bladder encroached upon and its contour changed by the pressure of a displaced or an enlarged uterus, by abnormal conditions affecting the adnexa or by new growths and pelvic exudates. As these pathological conditions affect chiefly the floor and sides, as well as the lower rear wall of the bladder (those parts which are in the greatest danger of coming into contact with the lamp of the instrument), it will readily be seen that in order to carry out the examination in such a manner that the patient may run the least risk and the examiner be given the maximum of information, a technic must be employed when examining the female which differs somewhat from that employed in the male.

The method which has given me the best results is, in brief, as follows: The patient, having loosened the clothing about the waist, is placed in a semi-recumbent position upon the examining-chair or table, her feet resting upon the foot-rests, the knees flexed and the thighs well separated. The chair or table must be of such a height that the eye-piece of the cystoscope will be on a level with the examiner's eyes. The external genitals are thoroughly cleansed, after which the meatus is specially cleansed; the urethra may also be irrigated with a 1-10,000 solution of bichloride of mercury, although this is not imperative. The urine is then drawn off by means of a metallic catheter, previously sterilized by boiling, and is put aside for examination.

The next step is thoroughly to irrigate the bladder until the fluid returns perfectly clear. It is important that care be taken to have it perfectly clear, as the slightest turbidity seriously detracts from clear vision during the process of examination; the cleansing may, at times, severely tax the patience of the examiner, especially if there be a bleeding-point within the bladder-cavity, or a discharge of blood or pus from the ureters. As soon as the fluid returns clear, we proceed to the filling of the bladder. It will be found that the quantity required to distend sufficiently the bladder of the female is greater than that required for the male; whereas, in the latter, 150 c.c. are usually safe, we require between 200 and 300 c.c. to properly distend the bladder of the former. At times, especially if the bladder be the seat of a severe inflammatory process, it will be found that the viscus will tolerate the injection of only a very small quantity of fluid, promptly expelling the entire contents if more be injected. In these, and only these cases, the bladder may be rendered more tolerant by the injection of a 1-per-cent. solution of cocaine, or of 2-per-cent. beta-eucaine. Seldom is general anesthesia necessary. I have, in irrigating and filling the bladder, come to use only a 1-per-cent. solution of boric acid.

When the bladder has been filled, the cystoscope, previously sterilized, is connected with the battery and tested, to ascertain whether the lamp

is perfect, and after lubrication with sterilized glycerin or one of the aseptic lubricating pastes, is inserted into the bladder, the beak being directed upward during this step. At the meatus one often meets with a hindrance to the insertion of the instrument, since the meatus is in many women small and very sensitive. This hindrance may usually be overcome by placing in the urethra for a few moments a small pledget of absorbent cotton moistened with 2-per-cent. cocaine solution, so that the meatus and a centimeter or so of the canal are brought into contact with the anesthetic. Of the obstructions to the introduction of the instrument little need be said, as they do not occur so frequently nor are they so severe as in the male. Strictures of the urethra are not of very frequent occurrence and usually, when present, of not very marked degree. When, however, they occur, preliminary dilatation of the urethra must be employed. Fissures of the urethra, as well as mucous polypi or caruncles, may offer a decided obstruction by rendering the urethra exquisitely sensitive. This obstruction may, however, usually be overcome by anesthetizing the urethra or by the removal of the new growth, followed by cauterization of its base. Foreign bodies or calculi in the urethra are not frequent, and when present must be removed, a procedure rendered comparatively easy by the short canal. Pelvic tumors or exudates, as well as marked enlargement, or displacement of the uterus, may render the examination very difficult or even impossible of performance. Still this may be overcome in the majority of cases by sufficiently distending the bladder with fluid; when the viscera are *fixed*, as sometimes occurs in old peritonitic or parametritic exudates which have gone on to the formation of atrophic connective-tissue bands, or when the tumor is of such weight that the pressure of the intravesical fluid is not sufficiently great to lift the mass, the interference may make the examination impossible.

The next step, to my mind probably the most important of the precautionary measures, is the thorough exploration of the cavity of the bladder, using the unlighted cystoscope as a sound. This maneuver, which, I believe, originated with me, has proven of the greatest value, as it acquaints one with the relative position of the uterus—the chief source of encroachment, and with the presence or absence of any other serious obstruction or distortion, and gives one an idea of how great a degree of excursion the cystoscope may safely make during the examination. Too much stress cannot be laid upon this simple procedure, which has made it possible for me to avoid injury in many cases which must, under the older methods, certainly have suffered as a result of marked distortion of the bladder. Especially valuable, therefore, is this procedure in cases in which abdominal or pelvic tumors are present, or their existence is suspected. If we bear in mind the fact that we insert into the bladder an electric lamp which is capable, even though small, of causing severe cauterization of those parts of the bladder-wall

with which it remains for even a short time in contact, we can readily explain the occurrence of infection after cystoscopy, of which we so frequently hear complaints. As a result of repeated examinations of cases (both male and female) in which infection had followed cystoscopy, I have come to the conclusion that, when infection occurs after a cystoscopy in which proper aseptic precautions have been observed and in which there has been no extensive wounding of the urethra, the infection is in almost every case due to a cauterization of the vesical wall. I cannot believe in the "urethral fever" of nervous origin, but hold that in each case it is the result of an infection. A measure which has proven of great aid to me in preventing infection in this, as well as in all other urethral or vesical instrumentation, has been the use, whenever possible, of urotropin, in doses of 0.5 gram three times daily, for several days preceding the operation.

After having assured ourselves of the position of the uterus, of the presence or the absence of any tumor-mass, we next proceed to illuminate the bladder and to methodically examine the entire wall, beginning with the anterior portion, then passing to the lateral, and lastly to the base and rear wall. As the trigone is the most frequent seat of changes—for here we find the larger portion of inflammatory processes and tumors, as also calculi and other foreign bodies—we must direct the most careful scrutiny to this part. The finding of the ureters is frequently a matter which presents a great deal of difficulty to those not very familiar with the conditions affecting the location or dislocation of the orifices, and the great degree of variance in the size and appearance thereof. The most reliable rule is first to locate the ligamentum interuretericum by examining the floor of the bladder from the lower sphincter margin backward. This having been found, the cystoscope is turned to the right or to the left till an angle of thirty or forty degrees from the perpendicular is reached, when the ureteral orifice will usually be found somewhere within the field of vision. Having found one, it should not be difficult to locate the other. Some authors recommend that in locating the second the cystoscope be turned so that the point of the lamp moves upward describing an arc through the greater part of a circle about the long axis of the instrument, thus minimizing the danger of injury to the bladder-wall. That this procedure has some virtues is self-evident. However, the movement of the instrument in the urethra should be no greater than necessary, and experience has led me to prefer to turn the lamp downward through an arc of from sixty to eighty degrees, following up the ligament to the other side and avoiding injury at the same time by slightly depressing the ocular end of the instrument, thus lifting the lamp well away from the lower posterior bladder-wall.

As the bladder-wall has not been anesthetized, even slight cauterization with the lamp will cause a burning pain to the patient, and it has been the

writer's rule to instruct the patients to call attention *at once* to any painful sensation. If we be in doubt as to whether the pain is due to a burn or simply to the presence of the cystoscope in the urethra, the extinguishment of the lamp will quickly clear up the doubt. If the pain be urethral this maneuver will not affect it, while slight movement of the unilluminated instrument will call it forth or increase it; if due to a burn, the extinguishment of the lamp is at once followed by an easing of the pain, while, if the lamp be left burning, the pain rapidly increases in intensity. I have seen severe infections, local as well as general, occur as the result of severe cauterization of the anesthetized vesical mucous membrane, even when the examination was performed by masters of the art, and have in consequence been led to avoid anesthesia whenever possible.

When the examination has been completed, the cystoscope is removed, with the beak upward, after the extinguished lamp has had a few moments to cool off; and if no cauterization has occurred, the contents of the bladder are allowed to flow off, with the exception of about 50 c.c. When, however, cauterization has occurred, however slight in degree, it is advisable to remove the entire quantity and to inject about 30 or 50 c.c. of a $\frac{1}{8}$ -per-cent. solution of nitrate of silver, which is allowed to remain until the next urination. Observance of these rules and precautions has made it possible for me to reduce cauterizations or injuries of the bladder-wall to the minimum, even when, in my course of instruction, the cystoscope was placed in the hands of students; it has also been possible to avoid infection by their proper observance.

It does not come within the scope of this article to discuss the views advanced by some writers concerning the limited applicability of cystoscopy as also the earnest warnings against the dangerous character of the procedure. I can only say that it has given us a means for the attainment of *certainty* in the diagnosis of hitherto obscure vesical and renal conditions; that I believe it to be, when properly employed, less dangerous, even, than the other and older means of diagnosis; that its dangers have been overestimated, when it is in skilful hands. Neither the cystoscope nor any other instrument has any business in the hands of bunglers.

717 Madison Avenue.

MEDICAL PROGRESS.

MEDICINE.

Whey in Typhoid Fever.—Diet in typhoid fever, especially during protracted attacks, is a question which often troubles both the patient and the physician. Recently in Great Britain whey has been used as a partial or complete substitute for milk. A. T. BRIDHAM (Lancet, Mch. 15, 1902) gives the following note on the subject. Quoting P. G. Selby he reviews a series of seventy-three cases with a death-rate of 2.7 per cent. This series appeared in the Lancet, November 2, 1901. Since then S. J. Gee of St. Bartholomew's Hospital, London, has treated four cases entirely and one

case partially with whey. All did well. One of these cases deserves special notice on account of its severity and the favorable issue under this more or less new departure in treatment. Without reporting the case in detail, the most noticeable points were the following: Although repeated hemorrhages and other marked symptoms were present, there was no distention of the abdomen. Another patient taking one-half pint of milk with whey showed more distention on the third day after admission than did the first throughout his illness. From the size and thickness of the sloughs which accompanied and followed the repeated hemorrhages the author is convinced that had the patient's intestines been distended perforation must have followed. Delirium was also absent throughout the disease except for a short time on one or two occasions. There was no serious diarrhea in spite of the severe ulcerations. The bowels were loose, but never troublesome. It appears that possibly these three symptoms are often much aggravated by toxins due to decomposing milk curds. With regard to the state of the mouth and tongue, no change for the better was found because it was dry and cracked and difficult to keep clean:

Gangrene During Typhoid Fever.—The following case of gangrene of the skin during an attack of typhoid fever is reported by A. S. BARROW (Lancet, Mch. 15, 1902). The woman was married, afflicted with the disease in May, 1901, on its twenty-sixth day she had a severe hemorrhage from the bowels, another twelve hours later, and then she passed into collapse from which it was difficult to arouse her; on the twenty-eighth day a small bulla appeared over the left outer malleolus and a large bulla over the right buttock; both shriveled up within twenty-four hours and left a black patch beneath them, devoid of sensation. The site of the bulla over the malleolus formed a slough which was removed, leaving a punched-out ulcer one inch long and one-half inch wide extending down to the subcutaneous tissue. The bulla over the buttock formed a slough more gradually, but in ten days a large slough was removed, leaving a deep, excavated ulcer with sharply punched-out edges, one and one-fourth inches deep, three inches long and two inches wide. This was slow in healing, but with the patient lying chiefly on her face a good result was obtained. The ulcer over the malleolus healed speedily. There were no bed-sores and the nursing was in the hands of a competent person.

Electrical Shock.—Electricity with its varied relation to medicine, especially as a cause of death, is still more or less an obscure subject. F. B. ASPINALL (Lancet, Mch. 8, 1902), although not a physician but an electrical engineer, contributes a paper interesting in many details. The chief questions and his answers to them which he gives are the following: Although not yet definitely determined, in the absence of positive proof it is probable that not everyone is equally susceptible to an electrical shock. There are a number of diseases, especially such as affect the general nutrition and strength, which make the victim of them more likely to be fatally injured by an electrical shock than if he were in a perfectly good condition. The path which the current takes through the body probably has an important effect. For example, if the vital organs be directly in the transit of the current, the result is more instantly fatal or apt to be. The most important of all questions is that of contact and no doubt it is certain that the rapidity and absolute hopelessness of the fatal shock depend more upon perfect contact than upon anything else. Death is usually accompanied by a peculiar cry, inspiratory in character. From a medical standpoint this is probably due to the tremendous spasm of all the

muscles accompanying death and directly dependent no doubt upon a spasm of the diaphragm. The direct currents are probably much more destructive within the same limits than are the alternating, although at one time the opposite was considered the truth. In the present state of knowledge little can be done to help anyone who has received a heavy shock of electricity. The writer thinks from personal observation that one of the very best things is to invert the patient instantly, so as to make the blood gravitate toward the brain. He quotes examples in which recovery has been secured after a two-thousand-volt shock from hand to hand. The patient was inverted and his chest thumped and artificial respiration done. He recovered in forty-five minutes. Another man received the same violent current and fell down a stair-case, remaining for twenty-five minutes without assistance head downward. He also recovered.

Obliterating Endarteritis.—The cause of this common condition is by no means settled. A. P. GOULD (Lancet, Mch. 15, 1902) says that it has been attributed to injury, to external cold, to neuritis, to injuries of a weak and depressed vascular system, to the repeated impact of foreign particles against the sides of a small artery setting up irritation or molecular unrest within certain of the endothelial cells, which manifests itself by arousing the little center mass of nuclear protoplasm to activity. As a matter of fact, so little is known of the ultimate causes and processes of disease that it is difficult to accept or reject such theories. Of the known causes syphilis is the most certain; influenza, alcoholism, erythromelalgia, cold, contusions, and profuse thrombosis or phlebitis may be regarded as more or less immediate factors of the disease. Diabetes usually causes gangrene by exciting it. There is little to say on the subject of treatment. The following may be carried out. Rest, local warmth, anodynes for pain, usually in large doses, massage to promote the collateral circulation, absorption through the lymphatics and evacuation of waste products from the cells and their tissues. In the acute stage the tenderness is too great to admit of it. In the early cases it must be cautiously employed. When the disease seems to be arrested and one has to deal with its effects only, it may be used a little more vigorously. Small, mummified areas of gangrene, especially in the extremities, may be left to separate of themselves. Extensive gangrene, especially the mixed form, demands amputation. The relief of the exceedingly great pain usually compels the patient to submit to the operation. The amputation must be done high above the gangrenous area and at a place and by a method which throw the least strain upon the vessels of the part. Thus amputation through the lower part of the thigh had best be preferred to disarticulation at the knee and musculo-cutaneous flaps are to be chosen in preference to pure skin-flaps.

Poisoning from the Application of Carbolic Acid to the Unbroken Skin.—A patient who had previously used a 2-per-cent. carbolic-acid solution for pruritus changed the strength of the solution to 4 per cent. to get a more satisfactory anesthetic effect. After a bath at midnight the solution was freely applied over the abdomen, pubis, thighs and lumbar region. Seven hours later intense pain was felt, apparently in the bladder. There were frequent chills, profuse, cold perspiration, vertigo, vomiting and a desire to evacuate the bowels. The eyes were prominent and fixed. Vertigo increased with an appreciable paralysis of the lower extremities and complete cessation of the functions of the stomach, bowels and kidneys, no urine being excreted for eighteen hours. Four hours after the beginning of the attack the patient became drowsy and was awakened from time to time by recurrent lancinating pains. Ene-

mata of hot water were retained. The urinary secretion gradually returned after a hot bath and compresses. Examination of the urine showed it to be smoky and to contain carbolic acid and abundant albumin. The appearance of the urine, writes J. W. WAINWRIGHT (Boston Med. & Surg. Jour., Apl. 3, 1902) led to the discovery that the patient had used a carbolic-acid solution as described. There was great depression for three days, with evidences of highly inflamed kidneys; in ten days the patient was entirely well. The carbolic acid was evidently absorbed more readily because of the ideal conditions following the hot bath.

Serumdiagnosis in Pulmonary Tuberculosis.—The existence of a specific agglutination reaction by means of which tuberculosis can be diagnosed is flatly denied by F. DeGRAZIA (Berlin klin. Woch., Mch. 24, 1902). Cultures of tubercle bacilli are agglutinated by blood-serum obtained from persons suffering from pulmonary tuberculosis; the same reaction can be obtained, however, by means of the serum of absolutely normal individuals or of persons having various diseases. Furthermore, writes DeGrazia, the blood-serum of tuberculous individuals will produce agglutination in cultures of staphylococcus pyogenes aureus, of typhoid bacillus, of diphtheria bacillus, of cholera bacillus and of bacterium coli. The intensity of the reaction in tubercle cultures is not constant. If emulsions of dead bacilli be substituted for cultures of living germs, the same reaction is obtained, although it appears somewhat more slowly.

Angina Cruris (Intermittent Claudication) and Allied Conditions.—Among the many names that have been proposed for the condition which is described as angina cruris by G. L. WALTON and W. E. PAUL (Boston Med. & Surg. Jour., Apl. 3, 1902) the "claudication intermittente" of Charcot and the "intermitterendes Hinken" of Erb are sufficiently simple for general use, but are misleading in that they emphasize an essential feature of the disorder (lameness) while drawing no attention to the essential symptom, namely, intense paroxysmal pain. The clinical picture of angina cruris consists of more or less frequent brief attacks of paroxysmal pain in the leg, affecting as a rule the same region, oftenest the calf, recurring at irregular intervals, generally when in the erect position, but sometimes when the patient is in bed, often accompanied by local asphyxia and cyanosis, and usually in a limb in which pulsation is wanting in the dorsalis pedis artery or the posterior tibial artery, or both. The attack resembles in its severity that of painful facial tic. The underlying cause is probably restricted circulation, whether resulting from (a) degenerative arterial changes incident to advancing years, (b) from congenital predisposition to feeble circulation and to arteriosclerosis, or (c) from acquired arterial disease, such as obliterating arteritis due to syphilis. Vasomotor spasm is the hypothetical exciting cause of the attack. Higier, Goldflam and Hagelstam collected many cases and concluded that the Semitic race is peculiarly subject to the complaint. Walton and Paul have seen one typical case and fifteen cases representing a modified type of the disease, but none of the individuals affected belonged to the Semitic race.

Leucocytosis in Scarlet Fever.—Of great value to the clinician from the standpoint of diagnosis and prognosis is the question of leucocytosis in scarlatina, which has been carefully investigated by J. M. BOWIE (Jour. of Path. and Bact., Mch., 1902) with the following results. Practically all cases of scarlet fever show leucocytosis, which begins in the period of incubation shortly after infection and reaches its maximum at or shortly after the height of severity of the disease, and then gradually sinks to normal. In ordinary simple

uncomplicated cases, the maximum leucocytosis is reached in the first week and the normal generally during the first three weeks. The more severe the case, the higher is the leucocytosis and the longer it lasts. A favorable case in any one variety of the disease has a higher leucocytosis than an unfavorable case of the same variety. The fever has no direct effect on the leucocytosis. The polymorphonuclear leucocytes are increased relatively and absolutely at first and then fall to the normal, the lymphocytes acting inversely; this cycle of events occurs in simple cases within three weeks. Eosinophiles diminish at the onset of the fever, increase rapidly in simple cases until the height of the disease is past, then diminish and finally reach the normal some time after the sum total leucocytosis has disappeared—in short, when the poison has been eliminated. The more severe the case, the longer are the eosinophiles subnormal before they rise again; in fatal cases they never rise, but sink rapidly toward zero and remain there. The leucocytes in complications go through a cycle of events similar in all respects to that of the primary fever. From the standpoint of diagnosis the leucocyte count gives no information, for most of the febrile affections with which scarlatina is likely to be confounded have a leucocytosis of their own. Measles which has no leucocytosis is rarely confounded with scarlatina. On the other hand, the differential count is of value, for scarlatina is one of the few acute infectious diseases in which one finds an increase in the eosinophiles early in the disease, which persists for some time. Thus tonsillitis and septic conditions should be readily distinguished from slight cases of scarlatina by a long-continued eosinophilia of the latter, and it is precisely in the differential diagnosis of such cases that the difficulty lies. From the standpoint of prognosis, leucocytosis is of practical value. In simple cases, if severe, and if the leucocytosis be high and rising, one may predict a favorable course; if the leucocytosis be low and stationary one may expect a tedious case. If, after the crisis in the temperature, the leucocytes steadily diminish, the case is doing well. If they stop in their return to the normal, or rise again, one may expect some complication, and, as nephritis is the one mostly to be feared, one may take the proper measures accordingly. In the anginose kind, with a high and rising leucocytosis, one may predict a happy ending. If low and sinking, while the objective symptoms are becoming aggravated, a fatal issue is to be expected. In the differential count, if the eosinophiles show a relative increase, the augury is good; if normal or if it sink after the first day or two, the case in all probability is a severe one. As long as the relative increase of eosinophiles is present, one cannot be sure that some complications will not ensue, whereas if the eosinophiles have come down to the normal in the usual way, one should be free from anxiety.

Abdominal Grippe.—The toxins of Pfeiffer's bacillus seem to exercise an elective congestive action upon the various vascular regions of the body by means of the mediation of the cerebrospinal and sympathetic nervous systems. It results in a definite series of vasodilator activities, in specified regions, such as the lungs, liver, intestines, meninges, etc. Hence, says E. MICHEL (*Gaz. de Gyn., Mch., 1902*), it is not illogical to suppose that these congestive processes can by preexisting condition so act that they appear as divers clinical forms, varying according to the organ most affected. But this does not explain the reason why the abdominal form should appear separately as an epidemic. In all probability, the abdominal congestion with an attack of grippe may so stir up the bacillus coli communis that it may act as the cause of the predominance of the gastrointestinal symptoms. Still this bacterium is doubtless

not alone responsible in every instance. Influenza may increase the virulence of streptococci and also the staphylococcus. Marchiafava, Massalongo, Weichselbaum and Galliard have described cases of enteritis occurring during or following pneumonia, in which the intestines were covered with glairy pseudomembranes and even fibrous membrane, due to the presence of the coccus of Talamon. It is difficult to distinguish clinical forms of abdominal influenza due to congestion alone, from involvements due to secondary organisms. The author distinguishes the following clinical forms in the disease: (1) The mixed form in which the abdominal symptoms are concomitant with the thoracic involvement; (2) that form in which the abdominal symptoms alone are present. This latter may give distention to a marked degree. Again it may simulate peritonitis and even typhoid fever. Abdominal influenza may coexist with typhoid fever. One will often have to rely upon the serum diagnosis to distinguish this disease from typhoid fever. There is a choleiform type which may be fatal and the pseudoperitoneal form is serious as the involvement is probably secondary to a colon bacillus infection. The pseudotyphoid variety may cause death in feeble patients or alcoholics by producing cardiac failure or by toxemia. Arteritis, phlebitis and enterorrhagia make the prognosis more grave. When there is much diarrhea intestinal asepis should be employed, with irrigations of large amounts of fluids. Cardiac weakness is to be combated with caffeine and sparteine. In pseudoperitoneal involvement, wrap the extremities in cotton wadding; for mucous discharges small doses of quinine are very beneficial.

Glycosuria in Rabies.—The diagnosis of rabies has always been fraught with the utmost anxiety to both physician and patient. The only means for the diagnosis of this disease in man before its actual invasion has been an experimental one, namely, the inoculation of rabbits with the extract of the spinal cord of the rabid animal. Anything that will strengthen this diagnosis or even render it probable when the means for experimental inoculation are not available is certainly of extreme value in practical medicine. This assistance is apparently furnished by the investigations of RABIEUX and NICOLAS (*Jouf. de Phys. et de Path. Générale, Jan. 15, 1902*). These observers examined the urine of many animals at all stages of the disease and even postmortem by means of the phenylhydrazine test and found the presence of sugar in the great majority of cases. They reach the following conclusion as regards the value of this discovery: Considering the inherent difficulty from the clinical standpoint of the diagnosis of rabies after the death of the animal, the frequency of glycosuria in this condition makes it an important element, alone or associated with other manifestations in the probability of the diagnosis. It is all the more valuable inasmuch as the examination for sugar in the urine of the suspected animal, whether dead or alive, is within the reach of every practitioner. In certain cases in which it is impossible to obtain the urine, the investigation is necessarily impossible. In certain cases sugar is not found; this would not warrant the exclusion of the disease. The urine of a woman suffering from hydrophobia was examined and tested with Fehling's solution; the result was negative, but with the phenylhydrazine test the result was positive, demonstrating the necessity of employing the latter test when the amount of sugar is very small. As to the time of the inception of the glycosuria, divergent results were obtained. In some cases it appeared only in the paralytic stage. In rare instances it was discovered in the very beginning of the disease, corresponding with unusual modifications in the behavior of the animal. In the case of herbivorous animals, the

urine of every animal examined showed the presence of sugar and in larger amounts than found in carnivorous animals. In these animals therefore, although glycosuria is occasionally found in other conditions, as vitular fever (an apoplectic affection in calves), this symptom has a real diagnostic value. The importance of this symptom is deduced not only from the fact that these animals constantly succumb to the disease, but also from the facts that frequently no pathological lesion is observed and no etiological factors can be discovered.

Disturbances of Nutrition in Syphilis.—That the patient afflicted with this disease suffers from a dyscrasia manifesting itself in anemia and malnutrition rarely escapes observation. In what way nutrition suffers is not definitely known. An investigation of this subject was made by GAUCHER and CROUZON, (*Jour. de Phys. et de Path. Générale*, Jan. 15, 1902), who concluded that the disturbances of nutrition caused by the syphilitic infection are analogous to those observed in all other chronic intoxications. In a large number of cases there was found a diminution in the elimination of urea. In 70 per cent. of them the nitrogenous exchange was below the normal. Since the final stages of nitrogenous metabolism occur in the liver cells, the lessening of the nitrogenous exchange in syphilis presents a peculiar interest, inasmuch as it indicates that the general retardation of vital processes that has been observed in this disease is bound up especially with the function of the hepatic cells.

Intestinal Sand.—Sand of the intestine is a curious phenomenon, rather rare, yet sufficiently common to warrant a general familiarity with it. D. DUCKWORTH and A. E. GARROD (*Lancet*, Mch. 8, 1902) have defined a true and a false variety. The false is composed of remains of vegetable foods resistant to the digestive fluids, perhaps a little incrustated with earthy salts. Pears, which often contain this sand before being eaten, are probably the most abundant source of this kind. True intestinal sand undoubtedly originates within the bowel and is devoid of any vegetable base like the foregoing. Chemically its constituents are approximately organic animal matter 72, inorganic, usually earthy salts, 28 parts in 100. This composition excludes biliary origin by its freedom from cholesterolin and the scanty traces of bile pigment. The sand occurs almost always with intestinal disorders, especially mucocomembranous colitis. The characters of the organic bases and the large numbers of bacteria included in it point to the intestine as the most likely seat of origin. When the patient of these authors was taking salicylate of bismuth, the sand was gray with a coating of bismuth. The richness of the material in urobilin and its poverty in unaltered bile pigment suggests that it is formed in a region of the bowel where the conversion of the bile pigment into urobilin is far advanced, namely, in the upper regions of the colon. The salts so largely comprising these concretions can hardly be formed in any but alkaline surroundings. The nature of the inorganic constituents is also fully compatible with intestinal origin. Nor is it necessary to look to unabsorbed residues of the lime in food as the sole source of supply, because numerous observers have shown that a large part of the excretion of this element by the body is affected by the intestine, while two, Kobert and Koch, found lime magnesia and phosphoric acid which accumulated in the empty clean colon in a patient with a fecal fistula. The patient of the authors of this paper partook of milk freely, but Bunge has shown that the actual amount of lime in milk is greater than in an equal volume of lime-water, so that this food may perfectly well have been the source of the lime.

Effect of Carbon Dioxide on Digestion.—From a

number of experiments performed on himself, F. PENZOLDT (*Deutsch. Arch. f. klin. Med.*, Vol. 73) concludes that carbon dioxide has no marked influence upon digestion, yet although it improves it in various directions. The secretion of hydrochloric acid begins sooner and reaches higher degrees, and if it ceases sooner this depends upon the general acceleration of digestion. The good effect of aerated waters in fever are thus to a great extent due to the stimulating influence of the gas, and in anacidity and mild atony they will undoubtedly be beneficial.

Dysentery in Epidemic Form.—Three epidemics of dysentery in a German town have been carefully studied by H. KRIEGER (*Deutsch. Arch. f. klin. Med.*, Vol. 73). In most cases the patients belonged to the poorer classes and all ages seemed to be equally susceptible, though the mortality was highest among those under the age of ten years. The average duration was forty days. Fever was absent or only moderate and the most frequent complications were bronchitis, bronchopneumonia and pleuritic exudates. In a few cases polyarthritis, peritonitis, pyemia, abscesses, albuminuria and cystitis were observed, but never hepatic abscesses. Certain parts of the city were invaded by the disease in each epidemic and in these the same houses and even the same families suffered repeatedly, though different members were affected each time. The disease showed a general tendency to spread from the original focus. Absolute immunity after one attack did not exist and there is no question that the disease spread by personal contact resulting from ignorance of its infectious nature. This ignorance should be corrected by proper instruction of the public and disinfection should be as carefully carried out as after typhoid.

Diagnosis of Hour-Glass Stomach.—The diagnosis of an hourglass contraction of the stomach, as it is seen most frequently after ulceration, is based upon the following signs: (1) Water poured into the stomach cannot be removed with the stomach-tube. This symptom is also seen with incontinence of the pylorus. (2) Toward the end of the lavage when the return water has already been clear, a sudden clouding will again occur. This is also unreliable, since it may happen when there is a spasm of the musculature limiting the antrum. (3) When air is injected into the stomach, first one half, then the other, will be inflated. In most cases this test is unsuccessful. (4) With the normal peristalsis of the stomach, both halves may become prominent under the abdominal wall. This, however, occurs only rarely. C. A. EWALP (*Deutsch. Arch. f. klin. Med.*, Vol. 73) adds two other and more reliable signs, as follows: The stomach is filled moderately with water and a small electrical light is then passed down. Only the cardiac half of the stomach will be transilluminated, even if this part be behind the ribs, while the pyloric half can be made out by percussion. Secondly, a small rubber bag, capable of inflation, is passed into the stomach. In case of stricture, a prominence in the left half of the epigastrium will form when the bag is distended and this prominence cannot be pushed to the right.

Bactericidal Powers of Roentgen Rays.—The effects produced in cultures of micro-organisms by the Roentgen rays have been tested by H. REBER (*Münch. med. Woch.*, Mch. 11, 1902). The bacteria investigated were the cholera vibrio and the bacillus prodigiousus and coli and the plated cultures were covered with a lead sheet with a central hole and held very near to the tube. A distinct bactericidal effect was noted in all experiments. A number of other factors might, however, play an important part in this action such as the fluorescence, heat, ozone, the electrical changes and alterations in the composition of the media. By cover-

ing the plate with paper impervious to light the fluorescing rays were prevented from reaching them and the effects of the heat generated were ruled out by an interposed plate of hard rubber. The ozone present could not have played a prominent part, because control cultures in the same room were not influenced and any possible electrical action was eradicated by another plate between tube and cultures. There were no changes in the media, for these were as fit for culturing before as after exposure. All this proves a specific bactericidal action for the X-rays themselves which shows itself already in from twenty to thirty minutes, but is much less marked in fully-developed colonies. Since the conditions are so very much different in the human bodies and there is great danger of injuring the skin, it follows that little can be expected in the treatment of infectious diseases.

Arteriosclerosis of Cerebral Vessels.—Arteriosclerotic changes of the arteries of the brain are responsible for cerebral hemorrhage, thrombosis and aneurism, but the arteriosclerosis alone is capable of producing a set of symptoms which are not often dwelt upon in the text-books. According to D. WINDSCHIED (Münch. med. Woch., Mch. 4, 1902), the most prominent sign is a certain mental fatigue seen best in those who use their brain most. Authors, poets, etc., will cease to produce new things and they will be spoken of by the laity as "becoming old." Headache is generally troublesome in the form of pressure over the forehead which is present the entire day and aggravated by all physical exertion. There is also complaint of vertigo of a moderate degree and of an annoying loss of memory. Some show a remarkable intolerance toward alcohol. These symptoms are not present in all cases, since often the arteriosclerosis manifests itself only by the sudden appearance of hemorrhage or thrombosis. No doubt there is a very delicate mechanism at work in the brain for regulating blood-pressure, so that compensation may be perfect in these cases up to the onset of the catastrophe.

Gastric Spasm.—In addition to the well-known form of general tetanic contraction of the stomach, two other phenomena of this nature have been observed by I. BOAS (Deut. med. Woch., Mch. 6, 1902), namely a tonic contraction of the fundus and a tonic contraction of the pylorus. The latter may be considered as either a sign of organic stenosis or as a symptom of a nervous spasm; its rarity and the difficulty of palpation preclude any extended description. More important, however, is the fundus contraction which the author has found of frequent occurrence and in some cases of marked significance. It can be demonstrated by stroking the fundus of the full stomach with the hand for a short time, until a gradual stiffening can be perceived which disappears after a few seconds with a gurgling sound. This phenomena varies with the individual patient; by some nothing is felt; others are the subject of severe attacks of pain. The author believes that this is the preliminary sign of a gastric tetanus, as the fundus, which does not normally take part in the peristaltic movements of the stomach, here assumes the function of expelling the gastric contents. The continuous failure to overcome a resistance at the pylorus soon converts a tonic into a tetanic spasm. The condition therefore can be considered a danger-signal pointing to an obstruction at the pylorus, either functional or organic. This phenomenon of fundus contraction may also serve as a differential diagnostic point in cases that would otherwise be considered merely gastric atony, and when present in patients with dyspeptic symptoms, prolonged retention of gastric contents, etc., it may be safely taken to mean that cicatrization from old ulcers or some other cause is producing a pyloric stenosis. In this way the

question of surgical interference might be largely influenced.

Scarlet Fever.—There is every reason to believe that the bearer of the contagion is the exfoliated epithelium, hence, concludes W. W. ROBERTSON (Pediatrics, Mch. 1, 1902), until the eruption makes its appearance the disease cannot spread. The communication is probably effected by the respiratory tract, or possibly through the alimentary canal. It has been conveyed by milk. There is no characteristic morbid anatomy, the eruption, unless hemorrhagic, fading after death. The eruption makes the patient look like a boiled lobster and disappears on pressure to return promptly when the pressure is removed. At times the eruption is patchy. When severe it itches or burns. The mouth, except the tongue, is bright red; after a few days the tongue desquamates and appears bright red also. The duration of simple, uncomplicated scarlet fever ranges from three to fourteen days. In the variety called "anginose" the throat symptoms are severe and there may be a false membrane; indeed, the throat may present all the features of a severe diphtheria. The ear is almost certainly involved. In the "malignant" variety there is great prostration, cyanosis and delirium. In the "hemorrhagic" form there are more or less extensive hemorrhagic extravasations, epistaxis and hematuria. The treatment is liquid diet, with good nursing, cool sponging or the cold pack if the fever be high, and inunction with cold cream or sweet oil to allay the skin irritation. If the throat require attention it may be sprayed with peroxide (1 to 3), bichloride (1 to 5,000) or carbolic (1 to 50). Cold water or ice externally gives comfort. An efficient throat bandage has pockets opposite the tonsils, and in these, pieces of ice are placed, or India rubber bags may be used. Paracentesis should be practised early if the middle ear be involved.

Ankylostomiasis.—On account of the increasing frequency of this supposedly rare condition J. B. GREENE (N. Y. Med. Jour., Mch. 15, 1902) reports the case of a sailor who came to New York after several cruises to the Maine coast, and who gave a history of having been South a few months previously. He complained of pain in the epigastrium, especially on the left side. The bowels were loose and the patient presented the picture of one suffering from severe anemia. The spleen was palpable and the hemoglobin was 44 per cent. The temperature remained about 100° F. The stools contained mucus and blood and upon microscopical examination revealed large numbers of eggs. Thymol and malefern were given and the patient recovered.

Diagnosis of Gonorrheal Arthritis.—In determining whether a case be one of articular rheumatism or one of gonorrheal arthritis, M. E. FRYCH (Med. Times, Mch., 1902) offers the following suggestions: Rheumatic fever is almost invariably a multiple-joint affection. The knee is the most frequent site and next in frequency the ankles, elbows and small joints are affected. In gonorrheal arthritis a single joint is usually involved and the condition rapidly becomes chronic. The temperature curve in the latter condition is very irregular and remittent and the patient shows signs of malnutrition, the inflammation showing signs of destructive processes. A history of previous gonorrhea is important.

Compression Cough; Its Importance in Diagnosis of Bronchial Stenosis.—In an article with this title J. GAREL (Ann. des mal. de l'Oreille, March, 1902) in which he brings forth evidence that various forms of compression of the bronchi in the mediastinum by tumors, enlarged lymphatic glands, aneurisms and the like are invariably accompanied by that peculiar and characteristic cough which he has designated a "compression cough" and which he regards as pathognomonic

of compression of the bronchial tubes. It is a whooping-cough with reverberating, brazing and deep-toned quality and cavernous timber, alarming to those who hear it. It has been called dog-cough, hysterical cough, nervous cough, etc. The author admits a nervous cough, a sort of convulsive respiratory tic cough, but claims it is far different from this sonorous cough. The whooping-cough is a reflex pure and simple from irritation of the vagus or its recurrences; but this cough has in addition the element of compression of the bifurcating bronchi. He lays emphasis on the sonorous and cavernous character as distinctive. It does not make the diagnosis, but it points out where the lesion is and how it acts. The author has had the cough registered on phonograph cylinders because of the comparative rarity of the cases clinically. Its value is enhanced because of the difficulty of getting Weill's sign of flatness.

Posture and Heart Murmurs.—Very little attention has been directed to the influence of posture on heart murmurs. A great many vague allusions have been made to it, but no one has as yet taken the trouble to graphically map this out. W. GORDON (Brit. Med. Jour., Mch. 15, 1902), in an article which is profusely and clearly illustrated, concisely and interestingly presents the subject. He divides the problem as follows: (A) "Hemic" murmurs; (1) in the pulmonary area; these are the murmurs the variation of which with posture have been definitely insisted upon; (2) at the apex; the systolic apical murmur is also greatly influenced by posture, both in loudness and area of audibility; (3) in the aortic area. Here we often find diffusion of murmurs heard in recumbency which can readily be separated when the patient stands; (4) venous hum in the neck, although not a cardiac murmur, it naturally falls under this classification and contrary to the usual statement seems to the author to be best heard lying down. (B) Organic murmurs; (1) mitral regurgitation; the influence of posture is particularly well marked in cases of recent murmurs developing in the course of chorea or acute rheumatism. They tend to be more evident when the patient is lying down; (2) mitral stenosis; here just the reverse appears to obtain. The loudest murmur the author has ever heard was scarcely audible when the patient was recumbent; (3) tricuspid regurgitation; this murmur is variably affected; as a rule, however, it seems to be increased when the patient is lying down; (4) aortic regurgitation; here posture has remarkably little effect; (5) aortic stenosis; this is often considerably increased by recumbency. The problem naturally presents itself, What is the cause of these variations? One important factor is the influence of change in chest depth. After measuring several dozens of chests to ascertain some general mean in the intraposterior diameter, Gordon found that in the normal elastic chest the space which contains the heart becomes on recumbency shallower by about one-sixth of its depth. Such an alteration must bring a listening ear appreciably closer to the murmur-producing orifice. Gravity, as already pointed out by Allbutt, seems to increase the hum when the patient is in the upright position. Can gravity have any effect on the murmurs in the heart? It seems very probable that it does. If gravity really exercise the influence which experiences seem to show, a number of interesting questions arise. For instance, does the patient in the last stage of mitral regurgitation assume a forward position when trying to sleep in order to bring gravity to his help? In conclusion, it seems that recumbency tends to increase all hemic murmurs except the "hum," which it tends to obliterate; to increase the murmurs of mitral regurgitation, tricuspid regurgitation and aortic stenosis; to decrease the murmur of mitral stenosis, and to leave little if at all aortic

regurgitation. The effects of gravity and of change in chest depth seem to account for the influence in recumbency. Therefore, in describing murmurs which are modified by posture, the patient's position should always be stated.

Roentgen Rays in the Diagnosis of Intrathoracic Tumors.—The diagnosis of all complicated intrathoracic conditions is well known to be attended by the greatest difficulty. Particularly is this true of primary malignant growths and of the early stages of aortic aneurism. J. MAGEE FINNY and E. J. M. WATSON (Brit. Med. Jour., Mch. 15, 1902) present a paper with Roentgen photographs which show very beautifully the three cases they present in detail. The first proved to be that of sarcoma of the right lung and, inasmuch as the symptoms were singularly obscure and difficult of interpretation, they may well bear repetition. The patient was a dressmaker, aged thirty years, whose history was indefinite. For the past three or four months she had lost weight and had not felt well. Six weeks before she experienced slight pain on the right side, had a cough and expectorated a little blood. At this time she noticed that the right breast was larger than the left and the right side of the chest seemed swollen. On physical examination the only objective signs worthy of note were a prominence of all superficial veins on the right side and a moderate increase in the size of the arm. The pulmonary examination revealed the characteristic signs of pleuritic effusion. She was consequently aspirated and 72 ounces of yellow serum drawn off. The latter third of this was blood-stained. It did not coagulate and presented no inflammatory corpuscles or morbid cells. An immediate improvement was noted. The varicosity of the superficial veins diminished and the edema likewise. In a week's time, however, the fluid reformed and at the end of twenty days a second tapping was done, sixty-two ounces being removed. This patient had already been X-rayed with a negative result, but after this tapping another picture was taken which showed very clearly the presence of a tumor in the lower right chest. Again in three weeks the fluid reaccumulated and was removed as before with corresponding relief. It again accumulated and she died suddenly in an attack of dyspnea about two months after the first serious symptoms had been noticed. There are some features in this case which are of particular worth. First, the character of the onset which lasted about six months was very insidious. It was not preceded by any operation for external cancer, nor was there at any time evidence of such growth. Although a necropsy could not be obtained, the symptoms and the photograph together prove without doubt that the disease was primary in the lung and because of the age of the patient was probably sarcomatous in character. Two other cases cited were each of aneurism. While these do not show in the radiograph with the same clearness as the tumor, it nevertheless admits of no possible shadow of doubt. Happily in each of these cases, by virtue of the early diagnosis which the rays enabled the physicians to make, cures were obtained by modified Tufnell treatment. It would seem, therefore, that particularly in aneurisms one may look in the future to very decided improvement therapeutically because of this new and incontestable help in early diagnosis. In both these cases there was a complete absence of all objective phenomena, and the only subjective symptom of any stress was an ill-defined pain in the thorax. It is worthy of note that with the fluoroscope the authors were not only able to detect the tumor, but to note its expansile pulsations.

Finlay's Theory.—In view of the suppression of yellow fever in Havana through the practical application of CARLO FINLAY's theory as to the infecting agent,

special interest attaches to his original papers (Revista de la Assoc. Medico-Farmacéutica de la Isla de Cuba, Jan., 1902) which were read by the author something more than twenty years ago before the International Sanitary Conference at Washington, and the Real Academia de Ciencias Medicas Fisicas & Naturales de la Habana. The ideas then advanced seem so plausible in the light of recent developments that one wonders how they failed of more general recognition. At the Washington conference he said, in part: "It is my personal opinion that three conditions are necessary in order that the propagation of yellow fever shall take place: (1) The presence of a previous case of yellow fever within certain limits of time. (2) The presence of a person apt to contract the disease. (3) The presence of an agent entirely independent for its existence both of the disease and of the patient, but which is necessary in order that the disease shall be conveyed from the yellow-fever patient to a healthy individual." And again at the Real Academia: "Yellow fever, at times, will travel across the ocean to be propagated in distant ports, while at other times the disease seems unable to transmit itself outside of a very limited zone. Once the need of an agent of transmission is admitted as the only means of accounting for such anomalies, it is evident that all the conditions which have hitherto been recognized as essential for the propagation of the disease must be understood to act through their influence upon the said agent. The fact of yellow fever being characterized both clinically and histologically by lesions of the blood-vessels and by alterations in the physical and chemical conditions of the blood suggests that the agent which conveys the infectious particles from the patient to the healthy should be looked for among those insects which drive their sting into blood-vessels in order to suck human blood. Finally, by reason of other considerations which need not be stated here, I came to think that the mosquito might be the transmitter of yellow fever."

PHYSIOLOGY.

Electrical Changes and Working Capacity of Muscles.—That there is an intimate relationship between the contraction of a muscle and the electrical changes that accompany this contraction, has been assumed for a long time, but the quantitative aspects of this relationship have never been experimentally demonstrated. The results of a research undertaken by BERNSTEIN and TSCHERMAK on "The Relation of the Negative Variation of the Muscle-current to the Working-capacity of the Muscle" (Pflüger's Archiv, Feb. 26, 1902), are as follows: When a muscle is caused to contract, from the point of stimulation an electric current passes to all parts of the muscle, the point of stimulation being negative to the rest of the muscle. This is what is known as the negative variation of the contracting muscle. When a weight is attached to one end of a muscle, the latter in contracting is caused to do work. In such a muscle, if the muscle-curve be studied, there will be found accompanying the ascending phase of the tracing an increase in the negative variation; in the descending phase there is a tendency to a diminution in the negative variation. In other words, the local as well as the general tension of a muscle by means of a weight places the muscle in a condition in which, up to a certain limit and in response to a maximal stimulus, it reacts with a negative variation greater in intensity and extent, and with a greater energy of contraction; but the latter increases with the degree of weight relatively quicker and reaches a maximum later than the negative variation. The authors believe they have proved a relation between the degree of weight carried by a muscle and the extent of the elec-

trical process aroused in it; as well as between the working-capacity and the declining phase of the negative variation. From this they draw the conclusion that the negative variation lying at the basis of the chemical processes represents a portion of that metabolic change which grows *pari passu* with the weight, and which is expressed totally in the measured heat.

Levulose in the Systemic Fluids.—Lack of a reliable method has heretofore prevented the definite demonstration of levulose in the blood and body-fluids. Conclusive evidence has however been afforded by a recently devised test elaborated by Neuberg, which depends on the facility with which methylphenylhydrazin combines with the keto-sugars, but not with the aldehyde-sugars, to form a definite crystalline compound with characteristic physical and optical properties. H. STRAUSS (Fortschr. der Med., Mch. 15, 1902) has employed this method in the examination of a series of eight transudates and exudates, and found a positive reaction in five cases. In three of the latter 100 grams of levulose had been given by mouth from one to two hours before securing the specimen. The other two specimens were pleural exudates taken from a patient with multiple lymphomata. The author believes that such observations afford definite proof of the existence of levulose in the tissue fluids.

Occurrence of Arsenic in the Human Body.—To determine whether arsenic really forms an integral part of certain organs of the body, notably the thyroid and thymus, as has been stated, K. ČERNÝ (Zeitsch. f. physiolog. Chem., Vol. 34, No. 3 and 4), after a very careful purification of all chemicals used, performed Marsh's test on a number of glands taken from patients who positively did not get any arsenic as medication. The experiments were all conducted in the same way up to the complete solution of the zinc which usually took three hours. In almost all thyroids traces, never amounting to more than $\frac{1}{100}$ milligram, of arsenic were found. The same results were obtained with livers, but more rarely positive with thymus glands. It may therefore be concluded, that though arsenic generally is present in the organs in question, its amount is so small that it cannot play an important rôle in animal economy.

Tryptic Ferment and Zymogen.—An example of the extreme complexity of physiological processes is to be found in the conversion of the tryptic zymogen of the pancreas into the active proteolytic ferment known as trypsin. This conversion is not a simple physical phenomenon, but is a chemical manifestation, resulting from the intervention of a third body which is known to be secreted by the spleen and the mucous membrane of the small intestine. Considerable light is thrown upon this subject by an investigation of the manner and rate of the formation of trypsin and its zymogen in the pancreas. According to H. F. BELLAMY (Jour. of Phys., Dec. 23, 1901) the pancreas of a dog presents two phases of activity: (a) A slow continuous phase feebly evident after the decline of digestion and reaching its maximum during complete fast. During this period zymogen is accumulating in the gland cells, and at the same time the contents of the latter, although consisting for the most part of pure zymogen, may if the previous intake of food be not copious enough to occasion its entire removal, include a certain amount of true trypsin; (b) a rapid and intermittent phase coinciding with the period of considerable gastric activity, in which, as advocated by Herzen, the inactive zymogen granules present in the cells receive from the spleen in the form of an internal secretion the agent with which to elaborate the active proteolytic ferment, trypsin, which passes forthwith into the gland ducts. The blood supplies the vehicle by which this product of the spleen is transported to the pancreas. It appears

to be carried by the solid elements of the blood, since serum does not contain it; if carried by the plasma it is destroyed by coagulation. The pancreas of a dog deprived of its spleen exists in the condition of complete and permanent atrophy; the elaboration of zymogen continues in the gland cells, this zymogen is excreted as such and if it becomes subsequently changed as to be of service to the organism, this process is carried on outside the pancreas, and occurs as the result of some agency other than the spleen. The mucous membrane of the small intestine, as shown by Pawlow, furnishes a product possessing the property of converting pancreatic zymogen into trypsin. This product is especially plentiful in the jejunum, and is elaborated quite independently of the spleen, the presence being manifest throughout the whole digestive cycle, as well in spleenless as in normal animals.

Local Excitation of Pancreatic Secretion.—It has for a long time been supposed that the presence of the acid chyme in the duodenum acts on the nerve terminals of the mucous membrane and excites a flow of pancreatic juice. It has been supposed that this secretion is the result of a local reflex, the centers being situated in the scattered ganglia of the pancreas or in the case of the jejunum, in the ganglia of the solar plexus. According to W. W. BAYLISS and E. H. STARLING (Proc. of the Royal Society, Mch. 7, 1902) the pancreatic secretion is not excited by a local reflex, for it also occurs after extirpation of the solar plexus, after destruction of the nervous filaments passing to the isolated loop of jejunum and also after intravenous injection of .01 gram of atropine sulphate. It must therefore be attributed to direct excitation of the gland or gland cells by a substance or substances carried to the gland from the bowel by the blood-stream. This substance, which is not acid, is produced in the intestinal mucous membrane under the influence of an acid, and when injected into the blood causes a copious secretion of pancreatic juice. This body, which is tentatively called by the authors "secretin," is associated with another body which has a pronounced lowering effect on the blood-pressure. The action of the acid is to split off the "secretin" from a precursor known as "prosecretin," which is present in relatively large amounts in the duodenal mucous membrane, gradually diminishing as one descends the intestine. "Secretin" is probably a body of very definite composition and of small molecular weight. This research shows a chemical sympathy between the pancreas and the intestinal mucous membrane, which sympathy has hitherto been assumed to exist between other organs, as the uterus and mammary glands, but has never been proved.

THERAPEUTICS.

A Substitute for Iodoform.—It has been asserted that the specific action of iodoform on tuberculous tissue was not peculiar to that drug, but that like properties were possessed by other substances, among them bone-charcoal. A. FROMMER (Deut. med. Woch., Mch. 20, 1902) has employed the latter in a series of cases including bone and joint tuberculosis and suppurating lymph-nodes. A 10-per-cent. sterilized glycerin emulsion was injected. The results obtained afforded no encouragement. The injection in pure bone and joint cases was always followed by a painful swelling, with rise of temperature, which lasted several weeks and sometimes resulted in acute abscess formation. The only evidence of value was found in the after-treatment of atypical resected joints and of excised lymph-nodes, but even here the granulations formed were pale and flabby. Another objection is the subsequent

pigmentation of the skin. The author concludes that there is nothing to warrant the substitution of bone charcoal for iodoform. The toxic effects of the latter he claims are due to use of an emulsion which has been sterilized or else exposed to the action of sunlight. In 1,000 parenchymatous injections only a slight infection of the needle track had been noted in a few cases. The presence of free iodine in the urine for two or three weeks, the author cites as proof that the iodoform is broken up and distributed through the system, thus having a general as well as a local effect. This fact can also be taken as grounds against the substitution of iodoform by a chemically indifferent substance, such as charcoal.

Mercurial Stomatitis and Proctitis.—It is a curious paradox that certain of the most serious difficulties which beset the syphilographers of to-day spring from the remedies employed, and not from the disease. Iodism and hydrargyria of the system must be induced, and, at the same time, all the associated evils of these two conditions are to be avoided or subdued. The etiology and prophylaxis of mercurialization in one of its worst phases, the stomatitis and proctitis, are very ably discussed by BOCKHART (Monatsh. f. prak. Dermat., Feb. 1, 1902). An experience gained in the treatment of more than 2,000 syphilitics has taught him that there is only one method on which one can rely to forestall this very serious complication, namely, by the use of potassium chlorate. The drug, however, loses its value unless employed in a very definite manner. In the form of a solution, as a mouth-wash, it is almost of no use; as a curative measure in cases of advanced stomatitis, it can also accomplish but little. The drug should invariably be used in substance, either as a tooth-powder, or as a paste, in the strength of 50 per cent. The patient should be instructed to use it two or three times daily, commencing from one to two weeks before the administration of mercury is begun. A soft toothbrush is recommended, and the drug is to be carefully carried into all the crevices of the mouth, but especially into the gaps which so often exist between the teeth and the margins of the gum. The author found that by this simple prophylactic procedure he was able completely to eliminate mercurial stomatitis from the list of complications, except in very rare cases of idiosyncrasy. An apparently inexplicable accompaniment of this method of treatment is the secondary effect upon the rectum; proctitis practically disappears with the stomatitis.

An experimental, or bacteriological, confirmation of these clinical data has been secured, by plating the washings from toothbrushes. The potassium chlorate brushes yielded by far the smallest number of colonies, and the least resistant. Bockhardt believes that it acts both as an oxidizing agent in the mouth, and as a stimulant for the buccal secretions, which he believes to possess germicidal properties of no mean importance.

Suprarenal Extract in Pneumonia.—It is now generally admitted that the internal administration of suprarenal extract increases the blood-pressure, some believing that its effect depends upon constriction of the peripheral blood-vessels, while others contend that it directly stimulates the heart. E. A. GRAY (Med. Rec., Apr. 5, 1902), having observed the rapid work of this drug in stopping pulmonary hemorrhage, was led to use it in cases of senile pneumonia. He obtained such favorable results that he has been led to believe that the drug is a valuable heart stimulant which may be advantageously employed in pneumonia where there is impending heart failure and impeded pulmonary circulation with coexisting renal inflammation. Increased peripheral blood-pressure does not seem permanent.

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THE STUDY OF CANCER.

THE interests of science and humanity demand additional light on the subject of cancer. The magnitude of the concerted effort that is being made by civilized society to produce this light can be fully appreciated only by one who attempts to follow conscientiously contemporaneous writings pertaining to the etiology, pathology and treatment of this dread disease. The need is urgent, and it is characteristic of the era that individual research should be supplemented and to a certain extent replaced by more efficient collective effort.

In Russia a collective investigation of the cause of cancer is being carried on by the statistical method under governmental auspices. In the present state of our knowledge work of this character is obviously more or less blind, though commendable. The avowed purpose of the Russian investigation is to compile a map showing that the disease is confined to certain districts and, if possible, to demonstrate the principles of its distribution. Without going so far from home for evidence of the public interest in cancer we may point to the work that has been done by New York State; while these researches have differed in method and scope from those undertaken by the Russian government, the motive

which prompted them was the same one of public necessity. In Buffalo the general cancer rate increased between the years 1880 and 1899 from 32 to 53 per 100,000, and these figures are not exceptional. It is true that they may be accounted for in part by improvement in diagnostic skill, yet even to-day the actual number of deaths from cancer is probably everywhere underestimated.

The second annual report of the Cancer Committee of the Harvard Medical School, in regard to the etiology of cancer, is published in full in the April number of the *Journal of Medical Research*. This report has already been alluded to in these columns, but its importance warrants an exact statement of the scope of the work and the conclusions reached. The objects of the investigation, which was conducted by a group of Harvard pathologists and bacteriologists, were to study the following claims of the adherents of the theory of the parasitic origin of cancer: (1) That a proliferation of epithelial cells analogous to the lesions seen in cancerous tumors can be produced by certain well-known protozoa (nodules caused by coccidium oviforme); (2) certain skin lesions characterized by epithelial-cell proliferation are due to the action of a so-called protozoon (*molluscum contagiosum*); (3) blastomycetes are constantly present in human cancers and are the cause of the lesion; (4) by experimental inoculations of animals with "blastomycetes" true epithelial or cancerous nodules can be produced; (5) the endocellular bodies seen in the protoplasm of cancer cells have a definite morphology, are "parasites," and the cause of cancer.

The conclusions reached after a year of research are that (1) the lesion produced by the coccidium oviforme is essentially a process of chronic inflammation and is not analogous to the lesion seen in cancer; (2) the lesion in *molluscum contagiosum* is characterized by certain changes in the epidermis, is not due to the action of a protozoon and is not analogous to cancer; (3) the so-called "blastomycetes" ("saccharomycetes") of Sanfelice and Plimmer are torulæ; (4) the lesions produced by these "blastomycetes" (torulæ) are essentially nodules of peculiar granulation tissue, are not cancerous, nor in any sense true "tumors"; (5) blastomycetes are not constantly present in human cancers; (6) the peculiar bodies seen in the protoplasm of cancer cells are not parasites, nor the cause of the lesions, but probably are in part at least atypical stages of the process of secretion by glandular epithelium.

These conclusions will not be universally accepted as finally disposing of the parasitic theory, but they will without doubt do much to discourage such efforts as have been recently begun or were about to begin to provide stronger foundation for that theory. If enlightenment concerning the etiology of cancer is to come ultimately from the side of physiological and pathological chemistry rather than from that of bacteriology, this purely negative report of the Harvard Commission will come to be regarded sooner or later as a valuable contribution to scientific medicine.

PURE FOOD AND POLITICS.

READ between the lines, the Hepburn "Pure Food" Bill, now pending in the House of Representatives, is a misnomer. Its title as it now stands should be "a bill entitled an act to enlarge and increase the powers of the Chief Chemist of the Agricultural Department and to give him supervision over the manufactured food and drug products consumed in this country and exported to foreign lands, and to empower him to pass judgment on medical and hygienic questions in so far as they may relate to the food and drugs consumed by the people of the United States."

In this bill the President of the United States is permitted to appoint a certain number of Army and Navy officers, with whom the chief of the chemical division may or may not see fit to consult on technical sanitary problems; the Chief Chemist is empowered under this bill to appoint more consultants than is the President of the United States, and his power over the commission is thus assured. Moreover, the bill arrogates to the Chief Chemist, whoever he may be, the fixation of standards of purity for the manufacture of drugs and foods of this country, and those interested in the manufacture of many billions worth of such products must step to the "chemist's office" and get the stamp of his official seal or shut up shop. Truly the chemist of to-day is about to realize the dream of the alchemist of old.

Not that we do not need standardized drug products nor pure foods. Such a proposition we do not for a moment question. But it is maintained that while within the provisions of this bill there are many most desirable features, there are certain absurdities, any one of which should preclude even its serious consideration.

If interstate commerce in manufactured foods and drugs is to be at all regulated, and it is in

serious need of most careful and wise regulation, such control should come within the jurisdiction of the Treasury Department of the United States Government, and, should questions of deleterious adulteration in food or drug products arise, such should be referred for investigation to the existing medical authorities of the Treasury Department, the present Marine-Hospital Service. The Agricultural Department should have no voice in matters of commerce or of medicine, preventive or otherwise. The Agricultural Department was not instituted for that purpose—its sphere of usefulness should not extend outside of the interests of the grower of crops. The Chief Chemist is chosen for his proficiency in agricultural chemistry; he is not a sanitary expert, nor a physiologist, nor a pathologist, nor a physician, nor is he called upon to possess a knowledge of the complicated details of interstate commerce. Why then should any representative now in office seek to wrest these duties from a department already organized to which they might be referred with much better chance of their competent fulfilment?

The present pure-food legislation emanating from the chemical side of the Agricultural Department of our Government is but a larger and louder "cry to arms" under the auspices of a "pure-food congress" which is strongly suggestive of a lobby at Washington keeping alive the agitation to enlarge the chemical division of the Bureau of Agriculture.

From the medical point of view this agitation has become a stench in the nostrils, since regulation of the manufacture and sale of pure foods and drugs can be better subserved by the proper branch of our Government service—the Marine Hospital Corps—which is infinitely better equipped for such service; especially should the proposed measure for the enlargement of the scope of this important service become a law.

The protection of the public health and the control of sound economics are the fundamental questions which underlie the necessity for a "pure-food law" and to the medical mind it is an amazing spectacle that committees in Congress should permit themselves to be misled in this important matter. To us the problems involved are sanitary, not chemical. A National Health Department—be it a reorganized Marine-Hospital Service or an entirely new organization—we should have, and the solution of these problems is assured.

THE JUDGE AS A MEDICAL EXPERT.

GREAT obsequiousness is paid by physicians to the opinions of judges on medical topics. Both the judges and their sycophants ignore the fact that the judicial function is not to make law, but to interpret it. Under the English common law, scientific matters must be proven by the ordinary laws of evidence; not laid down as dicta by judges generally destitute of scientific training and who go beyond their province in settling matters by an infallible dictum. The besetting sin of judges, as has been well remarked by great constitutional lawyers like Macaulay, is the tendency to make law in place of stating what the law is.

Judges and lawyers too often have the same proclivity for mysticism as clergymen have and with less excuse. The judicial mind is supposed to obey the laws of evidence. Judging from the endorsement given fetichism like Christian Science, Dowieism, patent medicines and advertising quacks by judges, the judicial mind is rare upon the bench: Nowhere is this absence of judicial qualities more evident in judges than in their dealings with medical practice acts, with the payment of experts, and with expert testimony itself.

That physicians should be ignorant of the rules of evidence and should fail to see that the great difficulty in expert testimony is that hearsay evidence cannot be admitted, and that most of the data obtained from a patient are (as has been decided in a rather contradictory Supreme Court decision) subjective and hence of the nature of hearsay evidence, is not surprising. Criticism therefore of expert testimony for the deficiencies which the law creates in it is hence wildly absurd. The law creates for the purpose of avoiding this difficulty a hypothetical case. The ideal method is where one hypothetical case is prepared for one side and the other by the opposing party and both hypotheses are submitted to the expert. Here two contradictory opinions could be rendered by an expert with perfect honesty, since he is not responsible for the validity of the allegations on which the questions are based. This is the true method of presenting expert testimony in scientific fashion. The expert, however, is criticized most for his candor. The allegation of venality is too often mendaciously made. The experts for the defense in the Guiteau case were criticized for venality yet not one received a dollar for expert services, but all testified practically under attachment. The experts first called

for the State in the Prendergast matter unanimously found the accused insane and therefore did not receive a dollar for their services. In the case of *The People vs. Luetgert*, the Cook County Board appropriated money to pay the experts in proportion to the services rendered by them to the State. Venality here would lie against the State, not against the defense. This is the rule in criminal cases. The expert, like the lawyer, frequently renders gratuitous service in the case of friendless defendants. On the other hand, the expert fund of the State is generally looted for callow graduates with a pull.

The judge, therefore, who flings broadcast accusations against medical witnesses ignores facts well known to the better class of jurists. Another great error in the judicial bearing of judges toward medical questions arises from the prehistoric medical lore from which so many judges start as a fixed standpoint. Mere party nomination to a judgeship does not constitute the nominee infallible on scientific topics. This, however, is ignored by many judges who believe that personal experience entitles them to speak with absolute authority on all science. This was well illustrated by Dr. William Darling in a discussion before the New York Society of Medical Jurisprudence some two decades ago (*American Journal of Neurology and Psychiatry*, p. 291, Vol. II). A servant girl charged the son of the family in which she was employed with getting her with child. Dr. Darling confined the woman. The question was whether the child was at full term or not, since, unless at full term, the young man was not responsible. When Dr. Darling was called and the question of gestation arose the judge said: "Did you ever see a seven-months child?" "No," replied Dr. Darling. "Well I have," said the judge. "How you know it was a seven-months child?" asked Darling. "Why, the mother told me so," replied the judge. Darling turned to him and said, "Why didn't you ask the mother in this case and save me the trouble of coming here?" Here the physician was guided by common law presumptions of innocence and requirements of evidence which the judge in his omniscient infallibility ignored completely. The truth is that medical infallibilities of the type which has learnt nothing and forgotten a great deal and the judicial infallibilities join in decrying expert evidence from the standpoint of evolutions from their inner consciousness and not from the standpoints of science and law.

The official expert has proved such a gigantic

failure in France and Germany (as witness the Dreyfus and other cases) that scientists like Virchow are urging a system closely resembling that of the English common law. The sooner physicians recognize that the judge is much more liable to err than their medical brethren and that medical expert disagreement "is a harmonic symphony compared to judicial disagreement," the sooner will the evils of the expert system be removed and the sooner will physicians secure proper pecuniary remuneration for expert services.

THE MEETING OF THE AMERICAN PHYSICIANS.

LAST Tuesday and Wednesday the Association of American Physicians held their seventeenth annual meeting at Washington. The attendance was unusually large, the papers read covered a wide field of inquiry and the discussions were singularly illuminating.

We have come to recognize that this body of physicians reflects more than any other the advance workers in the field of medical research, viewed in its larger scope, and each annual meeting is looked forward to as serving to bring out the forward steps made during the year and to suggest the trend of future inquiry. Seen from this standpoint the results at the present gathering were not as illuminating as might have been wished but there was an unusually large number of papers which served to make more certain some of the involved questions of prognosis and treatment.

Perhaps the most suggestive of the more theoretical studies, and the one which opens a large vista of possible results in future investigation, was the paper by Dr. Herter on experimental glycosuria which has been alluded to in our editorial columns of April 19th. Dr. Flexner's paper on cytotoxin studies, while following lines already being utilized in foreign laboratories, was also worthy of careful consideration. The possible explanation of the causations of chronic inflammations that Dr. Flexner offered is along a most highly suggestive and stimulating line of investigation.

In the field of practical medicine the discussions by Drs. Cabot and Shattuck call for special comment. Each emphasizes the idea which more and more is becoming recognized as a truth, that tuberculosis is a disease which, not rarely but very often, is recovered from. Dr. Cabot's paper on pleurisy serves to correct an old impression which has guided prognosis for many years.

From the standpoint of the separation of disease types the discussion promulgated by Dr. Osler was highly important. It emphasized the necessity for concerted inquiry in some of the borderland cases of multiple pathogeny and etiology. Dr. Kinnicutt again presented a clear-cut description of an interesting and important condition not readily recognized. The studies on smallpox and vaccines by Drs. Ewing, Councilman and Park were important, and, although as yet incomplete, offer much hope for the understanding of this important subject.

Other papers of high order were presented but for an appreciation of their many good qualities we refer our readers to the full account of the proceedings which is to be found in this week's issue of the MEDICAL NEWS.

ECHOES AND NEWS.

NEW YORK.

Health Department Advisers.—The appointments of the following honorary and advisory officials of the Department of Health were recently announced: George F. Shrady, M.D., consulting surgeon; Daniel Draper, Ph.D., consulting meteorologist; George Henry Fox, M.D., consulting dermatologist; Clarence C. Rice, M.D., consulting laryngologist; Arthur B. Duel, attending otologist, and Stevenson Towle, consulting sanitary engineer. None of the positions carries compensation with it. Under the last city administration, there were nineteen of these honorary and advisory positions in the Department, but not as many are now needed since Commissioner Lederle appointed a Medical Advisory Board earlier in the year. The latter board has proved a great success, according to Dr. Lederle and the Department officials, its meetings often being attended by all of its eleven members.

Magazines Asked for North Brothers Island.—Health Commissioner Lederle requests contributions of magazines for use at North Brothers Island. Any magazine, no matter of what date will be acceptable. They may be sent to Dr. Lederle at the department's building, Fifty-fifth Street and Sixth Avenue.

Results of Phthisis Treatment.—The Commissioner of Public Charities has given out a statement of the results thus far attained at the phthisis hospital, which was opened on Blackwell's Island on February 1st. The whole number of patients admitted to the hospital up to April 15th has been 273. With few exceptions, all the patients admitted were in more or less advanced stages of pulmonary tuberculosis. Rather more than 50 per cent. were in the last stage of the disease, with every indication of death not far distant. The other 50 per cent. consisted of two classes: First, those in whom all the typical symptoms of tuberculosis were present, but who yet retained a fair amount of strength; second, those whose general condition was less favorable, yet who retained sufficient strength to be up for the greater part, if not all, of the day. Of the 273 patients admitted, 55 have been discharged, 50 improved, and 5 not improved. The 50 patients who had improved have, as a rule, either returned to their work or have gone to the country or the mountains at the suggestion of physicians. Twenty-eight cases have been transferred to other wards on account of surgical

needs, or as showing no evidence of phthisis; and 76 patients, who, when admitted, were in an advanced stage of the disease, have died. There remain in the hospital 114 patients. Of the patients remaining 20 are new cases not yet classified, 40 are unable to leave their beds, and 54 are less advanced cases. Of these, 25 have shown decided improvement, and show an average gain in weight of 6.75 pounds; 13 show less improvement, but an average gain in weight of 1.9 pounds; 16 have not improved, and show an average loss in weight of 1.31 pounds.

Sheriff Seizes a Hospital.—St. Mark's Hospital, 177 Second Avenue, recently passed temporarily into the hands of the Sheriff because of a judgment of \$2,500 obtained against it by the J. Elwood Lee Co., of Conshohocken, Pa., manufacturers of surgical supplies. The difficulty which it has just surmounted will, in fact, be likely to prove a benefit, for it has served to arouse the sympathy of a great number of friends. "Our trouble came upon us through no fault of ours," said one of the physicians in charge. "We were simply made the victims of a mercantile concern in Philadelphia which chose, for some unaccountable reason, to treat us outrageously. Some time ago, we bought of this concern \$3,000 worth of dressing material, and as we needed what money we had, to make necessary additions in our laboratory, we arranged to pay for this material \$500 the first year, and the balance by 1903, providing we bought all the dressing material we needed in the meantime from them, paying cash for it. We fulfilled our part of the agreement, but a little while after the first \$500 was paid, this concern brought suit against us, secured a judgment, and proceeded at once to press it. We raised \$1,000 and gave it to them. In spite of this they sent a sheriff to take possession. They thought, no doubt, that this would frighten us, and that we physicians who give our time and services to this charity and always contribute what money we can spare, would, perhaps, pawn our possessions to keep the sheriff out. But we were not afraid. We opened the door and invited him in, but he was himself ashamed of his errand. He remained only a few hours last Saturday, after which he quietly slipped out and has not been seen since. Our friends rallied around us, and we have nothing more to fear." The twelfth annual report of the hospital has just been issued, and, by its facts and figures, the necessity of St. Mark's Hospital in this particular district is demonstrated. Since its incorporation on March 7, 1890, 95,239 free hospital days of treatment were given to poor patients absolutely free of charge, 22,566 hospital days of treatment were given to persons who could only afford to pay less than one dollar per day for board, and 15,643 out-door patients made 40,568 visits at the hospital and received treatment, medicine, bandages, etc., without any charge whatever. In the past year 6,735 free hospital days of treatment were devoted to free patients without compensation, 196 hospital days of treatment were devoted to patients who could only afford to pay less than \$1 per day for board, 1,468 out-door patients made 8,897 visits to the hospital, and received treatment, medicines, bandages, etc., free of charge, and 1,282 meals were given to poor persons applying for them. In all 2,681 patients were treated in the course of the year.

Little Fire at St. Vincent's.—St. Vincent's Hospital had a fire scare this week. There was just enough of it to try the nerve of the sisters, but not enough to cause any panic among the patients. The trouble originated in a leaking gas meter in the basement workshop on the Eleventh Street side. When the hospital carpenter entered the place about seven o'clock in the morning and lighted a match, an explosion followed.

He was hit on the head by a piece of the meter, and a pile of shavings on the floor was ignited. Policeman Irving, who was in the hospital watching a prisoner, heard the explosion and aroused the sisters before he ran out and sent in a fire alarm. The sisters quickly closed the doors to all the wards in order not to alarm the patients. The fire was put out before the firemen arrived.

Hastening Bronx Hospital.—The bill authorizing a bond issue of \$500,000 for a public hospital in the Bronx having received the Governor's signature, an organized effort is under way to secure the commencement of the work without a delay of years, as in the case of the Harlem Hospital, now being built, which was authorized in 1897. The bill calls for \$200,000 to be used for acquiring a site, and \$300,000 for the erection of a building.

Gift to Long Island College Hospital.—Henry W. Maxwell, President of the Board of Regents of the Long Island College Hospital in Brooklyn, is having a three-story fireproof building erected at Amity and Henry Streets, adjoining the hospital. He will present it to the hospital as a dormitory. The building will cost \$60,000. The hospital nurses have heretofore been obliged to live in private houses in the neighborhood.

Ill-timed Cleanliness.—It is a recognized scientific fact, we believe, that the street dust of cities is full of all kinds of bacteria, and especially of the germs of the dreaded tuberculosis. Naturally it must be most deadly in the places where men most do congregate. If there be any more densely populated area upon the face of this globe than the approaches of the Brooklyn Bridge between 8.30 a.m. and 9.30 a.m., it has yet to be discovered. Here, certainly, no sweeping ought to be attempted in the rush hours. Surely, even the intelligence of an assistant district foreman of street-cleaning ought to be sufficient to teach him that the sweeping of granulated street refuse into the faces of unoffending and helpless pedestrians is a practice as dangerous as it is unpleasant. The evil is not confined—in Brooklyn, at any rate—to any one region. In Nostrand Avenue, for instance—a great thoroughfare—sweeping frequently begins at eight a.m., just at the moment when men are hurrying from their breakfast-tables to their offices. Moreover, in this instance, the sweepers seldom even pretend to use any water for sprinkling. So common is the evil that comparatively little attention is paid to it, yet it involves an actual danger which very properly might provoke the interference of the Board of Health. Then again, in a civilized community, personal comfort and decency ought sometimes to be taken into consideration.

New York State Medical Association.—There will be a meeting of the Fifth District Branch of the New York State Medical Association, under the presidency of Dr. Emil Mayer, at the Academy of Medicine, Hosack Hall, No. 17 West 43rd Street, Manhattan, on Tuesday, May 6, 1902, at 1.30 p.m. The order of business will be an executive session followed by a scientific session, the latter beginning at 2.30 p.m. At the scientific session the following papers will be presented: "The value of X-rays in Medical and Surgical Diagnosis," by Walter H. Brickner, M.D.; "Diseases of the Air-passages from the Standpoint of General Medicine," by D. Bryson Delavan, M.D.; "Affections of the Skin with Stereopticon Exhibitions," by William S. Gatheil, M.D.; Installation of Newly-elected Officers.

Appointment to Mt. Sinai Hospital.—Drs. M. L. Maduro and Charles Preston Denton have been appointed anesthetists to Mt. Sinai Hospital. The object of two appointments is to fill the large service.

Physician for Indian Service.—The United States Civil Service Commission announces that on June 3,

1902, examinations will be held for the position of physician in the Indian Service. Information relative to the subjects and scope of the examination may be found in Section 128 of the Manual of Examinations, revised to January 1, 1902. Age limit, twenty-five to fifty-five years. From the eligibles resulting from this examination it is expected that certification will be made to the position of physician at the White Earth Agency, Minnesota, at a salary of \$900 per annum, and to other similar vacancies as they may occur. This examination is open to all citizens of the United States who comply with the requirements. Competitors will be rated without regard to any consideration other than the qualifications shown in their examination papers, and eligibles will be certified strictly in accordance with the civil service law and rules. Persons who desire to compete should at once apply either to the United States Civil Service Commission, Washington, D.C., for a copy of the Manual of Examinations and application Forms 304 and 375. The application should be properly executed and filed with the Commission at Washington prior to the hour of closing business on May 23d.

The Association of American Medical Colleges.—The next meeting of the Association of American Medical Colleges will be held in Saratoga on Monday, June 9th at 10 a.m. The program will consist of two portions, one of which will be educational and open to visitors. The several members of the Association of Southern Medical Colleges are invited to be present and take part in the discussion. The meeting will be opened by the address of the president, Prof. Victor C. Vaughan of the University of Michigan. This will be followed by a symposium and discussion on the question of how far the requirements for entrance to a medical college should include modern languages, Latin, and higher mathematics, and to what extent a knowledge of the biological sciences, chemistry and physics should be deemed necessary. This symposium will be participated in by the following gentlemen and any others who choose to enter the discussion: Hon. James Russell Parsons, Jr., Secretary of the Board of Regents of the University of the State of New York; Dr. George M. Kober, of Georgetown University; Dr. Robert Reyburn, Dean of Howard University; Dr. W. H. Earles, of the Milwaukee Medical College; Dr. Joseph T. Smith, of the Woman's Medical College of Baltimore; Dr. John L. Heffron, of the Syracuse Medical College; Dr. E. A. DeSchweinitz, Dean of the Medical Department of Columbian University; Dr. O. U. B. Wingate, of the Wisconsin Medical College; Dr. R. L. Whitehead, Dean of the Medical Department of the University of North Carolina; Dr. G. W. Hubbard, Dean of the Meharry Medical College.

The "Bulletin of the American Academy of Medicine," Charles McIntyre, M.D., Editor, Easton, Penn., is the official organ of this Association in which the Transactions of the Association have been published since the first meeting. The bibliography of the Association will be found in the Transactions of the Association for 1899 published in the "Bulletin" for June, 1899, page 3. A bound copy of the Transactions has been forwarded to the Dean of each medical college and to the secretary of each State Board of Health. The secretary cannot recommend too strongly that the members of the Association support the "Bulletin" liberally by their subscriptions.

No Cuban Quarantine Now.—Dr. Doty, Health Officer of the Port of New York, recently made the following announcement concerning Cuban quarantine regulations: "I have decided not to inaugurate the quarantine restrictions at this time. Cuba is free from yellow fever and unusual care is being taken to keep

it free. The summer regulations will not go into effect before June and probably, not then. I shall be guided entirely by the reports in future from Havana and other ports in Cuba. I recognize that the quarantine regulations against Cuba are a great obstruction to commerce and I wish to place as little hindrance to free intercourse as will be consistent with the protection of the public health."

Bellevue Nurses' New Home.—A nurses' home and training school will be built on the site of the old Matthews soda-water factory, opposite Bellevue Hospital. The property was recently sold by George Matthews to the recently organized Bellevue Realty Company for \$326,000. The Bellevue Realty Company was organized by wealthy friends of the Bellevue Training School for Nurses, which has long been in need of modern quarters.

PHILADELPHIA.

Slight Increase in Smallpox Cases.—The epidemic of smallpox which is rapidly abating showed a slight exacerbation for the week ending April 26th, there being 31 new cases and 6 deaths as compared to 26 cases and 1 death during the previous week. There was also an increase in the number of typhoid-fever cases.

Pennsylvania Hospital.—During the fiscal year ending April 26th the admissions to the wards of the Pennsylvania Hospital numbered 4,706. During the same time 23,040 cases were treated in the receiving wards.

Bryn Mawr Hospital.—The Garrett memorial wing of the Bryn Mawr Hospital and the new ward for children were formally opened April 26th. The new wing, which was built as a memorial to William E. Garrett, has doubled the size of the hospital as originally constructed. It contains twelve rooms for private patients and has been furnished complete at a cost of \$10,000. This addition has made possible the new children's ward in the old building.

Licensing the Social Evil.—At a meeting of the Social Purity Alliance, held April 24th, a recent report of the Grand Jury "advocating the licensing and regulation of vice by the civil authorities" was repudiated as being apt to influence evil opinion in an evil direction. Dr. O. E. Janney of Baltimore spoke of the ineffectiveness of the control of vice by the civil authorities. The segregation of vice, he said, is proven to cause a pest-hole in the city of New York. The remedy is to impose a fine of \$1,000 on the owners as well as on the occupants of buildings used for immoral purposes.

Pathological Society.—At the annual conversational meeting, held April 24th, Dr. M. P. Ravenel delivered the address upon the relationship of human and bovine tuberculosis. Many experiments to determine their intercommunicability were detailed, among which were successful transmission from human beings to cattle and from cattle to monkeys. Dr. Ravenel still maintains that bovine tuberculosis is transmissible to human beings.

Report of Delaware Sanitarium.—The twenty-fifth annual report of this institution shows that since its completion there have been 2,304,094 women and children cared for during the summer months at the sanitarium. Not a single serious accident has occurred while handling this immense number of people.

Carnegie and the Pittsburg Hospitals.—Mr. Andrew Carnegie has offered to aid in building a \$2,000,000 hospital for workingmen at Pittsburg, but refuses to erect such a hospital himself. This he claims would relieve the employer of all responsibility and perhaps in the end result in making him careless of the lives of

his employees. The workmen would also feel dependent, which many of them would resent. Mr. Carnegie favors an institution in which all the capitalists are interested; one to which they can send their workmen and pay for their care. To such an institution he will contribute liberally.

CHICAGO.

Revision of Dunning Rules.—It has been decided to formulate new rules to govern the County Hospital for the Insane and the Poor Farm. The appointment of a medical director, head nurse and a business manager makes this necessary. Drs. Hugh T. Patrick, Frank Billings, Julia Lathrop, President Hanberg, Commissioner W. K. Walker, and J. E. Flannigan were appointed a committee for this purpose.

Frances E. Willard Hospital.—The trustees of this hospital are considering a proposition to acquire additional east frontage in Lincoln Street, north of Harrison Street, and the erection of a hospital building which will cost approximately \$250,000. Requests have been made of about \$21,500, which leaves a little more than \$28,000 to be raised.

Banquet to Ex-Internes of Cook County Hospital.—On April 19th, Warden Healy of the Cook County Hospital, tendered a banquet to the ex-interns of that institution. Dr. William E. Quine was toastmaster and speeches were made by Drs. James B. Herrick, R. B. Preble, John B. Murphy, and others.

Ichthyosis Hystrix.—Dr. E. A. Fischkin reported a case of this disease and showed the patient to the Chicago Medical Society, April 23d. The case is interesting on account of its extreme rarity and striking form. The patient, a boy eight years old, was born with a large red spot over the epigastrium which existed for some twelve months. After a year the skin over the spot became dry and scaly, the red color changed to a dark brown, and dirty-looking patches began to appear on the skin, spreading gradually in different directions until at about the age of three the larger part of the body was more or less covered with these excrescences. From that period the disease has been quite stationary. The lesions affect the left side of the body more than the right and are distinctly margined at the median line. The component elements of the lesions vary in different parts of the body. In some, as over the chest, they are made up of small horny accumulations resembling the papules of senile keratosis, in other parts, as over the neck, axillæ and arms, they consist of projecting warts; again in other parts, as over the knee and heel, they represent firm, dense and shiny plates. In color they vary from light gray to dark brown and deep chocolate. The parts affected are the neck, chest and abdomen, which are almost entirely covered with these crusts, part of the back and gluteal region, left leg and heel. The most striking incrustations are found over the heel of the left foot, where they are hard, about a quarter of an inch thick and black in color, giving the appearance as if the heel were clad in a sheath of hard rubber or coal. The left arm is cyanotic and the backs of the fingers are covered with thick, black incrustations.

Oxyuris Vermicularis in Appendix.—Dr. William Cuthbertson exhibited an appendix in which the cause of the disease was the oxyuris vermicularis. The patient was a married woman, about forty-five years of age. The worms were alive and actively moving, some of them crawling off on his fingers after opening the appendix throughout its length. These worms are commonly supposed to infest only the sigmoid and rectum and are known as thread-worms. About five years ago he reported a case of appendicitis in a woman in which he found a lumbricoid worm. The two cases resembled

one another in the excruciating pain, somewhat high temperature, the rigid abdominal muscles, and, on opening the abdomen, the absence of peri-appendicular inflammation and adhesions. The author had no doubt that numbers of cases of appendicitis with only one attack, and commonly called catarrhal appendicitis, were caused by these intestinal parasites. This patient made an excellent recovery.

Large Gall-Stone.—The next specimen Dr. Cuthbertson showed was an enormous gall-stone which had been removed from the rectum of a man in whom it caused obstipation. At the postmortem the pyloric end of the stomach, the duodenum, and the hepatic flexure of the colon were all found to be adherent in one large mass, the union being so firm that the bowel could only be separated from the liver by the knife. The stone was found to have perforated, not the duodenum, but the hepatic flexure of the colon. The gall-bladder was obliterated and the opening into the colon was only large enough to admit a small probe. The common duct was still patulous, permitting the flow of bile into the duodenum, which would account for the persistent regurgitation of bile into the stomach and bilious vomiting. There was no trace of malignancy present either in the gall-tracts, liver or stomach.

CANADA.

The Birth-Rate in Ontario.—The Registrar-General of Ontario has handed out his report to the medical profession for the year 1900. According to this report there were 46,127 births in the Province in 1900, as compared with 44,705 in 1899, which shows an increase of 1,422. This gives a rate of 19.6 on the estimated population of 1900. The birth-rate of the actual population according to the census of March 31, 1901, would be 21.1.

Deaths from Tuberculosis in Ontario in 1900.—This disease caused 3,484 deaths in Ontario in 1900. The excess in cities is notable, there being 1,081 deaths in a population of 475,222, the rates being 2.27 for cities per thousand as compared with 1.59 for the Province as a whole, or 1.4 for the rest of the Province outside the cities. The death-rate in some of the leading cities in the Province in 1900 was as follows: Toronto, 2.3; Hamilton, 1.8; Ottawa, 2.3; London, 1.8; Kingston, 3.1.

Deaths from Cancer in Ontario in 1900.—There were recorded in the Province of Ontario in the year 1900 1,055 deaths from cancer as against 1,041 and 975 for the two preceding years. Commencing with 1891 the following is the total number of deaths for the last decade: 579, 676, 678, 621, 620, 731, 927, 975, 1,041, 1,055. It will be seen from these returns that the death-rate from this cause has increased by 100 per cent. in the last ten years. Of the total of 1,055 in 1900, 329, or nearly one-third, occurred in the fourteen cities of the Province. This would lead to the conclusion that there was a greater prevalence of the disease in the urban than in the rural districts.

Convocation at Bishop's Medical College, Montreal.—At the annual convocation ceremonies of the medical and dental faculties of Bishop's College University last week Dr. D. K. H. Cowley delivered the valedictory address, which was replied to by Dr. W. E. Deeks on behalf of the medical faculty. The Dean, Dr. F. W. Campbell presented his annual report. It stated that the attendance during the past session had been about the same as for the previous session, that a building fund had been inaugurated and \$2,000 already subscribed, and that Dr. Wood, one of the leading oculists of Chicago, had endowed permanently the gold medal which he had for some time been giving annually.

Dr. Roddick's Medical Bill.—Dr. Roddick went down to the city of Quebec on April 19th to interview

the Rev. Father Mathieu, C.M.G., the local director of Laval University, and to endeavor to overcome the objections which it was stated this university had to the passage of Dr. Roddick's bill for a Dominion Medical Council. It is understood that the interview was a satisfactory one and that many difficulties in the way of enacting this proposed legislation were removed.

Personals.—Dr. H. A. Beatty, M.R.C.S., of Toronto, who for the past four years has been doing post-graduate work in England and on the Continent, has received a cable from Mr. Tubby of the Westminster Hospital, London, England, offering him the surgical registrarship of that hospital. Before returning to Toronto Dr. Beatty had been senior house surgeon at this hospital. It is understood that he will accept the honor. Drs. D. M. Anderson, house surgeon at the Toronto General Hospital, and J. M. Jory of St. Catherine's, Ont., have been appointed medical officers to the fourth Canadian Contingent to South Africa and will sail from Halifax on May 7th.

GENERAL.

Pure-Food Bill Supported.—Mr. McCumber of North Dakota, Chairman of the Committee on Manufactures, addressed the Senate in Washington, this week, on the bill "to prevent the adulteration, misbranding, and imitations of foods, beverages, candies, drugs, and condiments in the District of Columbia and the Territories, and for regulating interstate commerce therein." The object of his address, he said, was to convince the Senate of the very great importance of the subject to the American people. For a quarter of a century nearly every State in the Union had been struggling, he said, with the question of procuring pure foods. Experience had proved that it had been impossible to obtain uniformity in State laws. This bill was not so drastic as had been proposed heretofore, and he believed that no legitimate objection to it could be raised. It attempted to regulate the sale of only such foods as entered into interstate commerce, and Congress, therefore, had ample authority to deal with the subject. Mr. McCumber enumerated many of the frauds in food products which constantly were being foisted upon the public, and declared that the time had come for Congress to act. The amount of deleterious food products placed upon the market each year, he said, was valued at fully \$1,170,000,000, while the total amount of adulterated food products each year was nearly \$4,000,000,000.

England's Campaign Against Cancer.—The recent appeal for a great fund for use by the medical profession in England for a systematic investigation of the cause of and the cure for cancer is meeting with liberal response, and intense interest in the subject is shown by the greatest people in the land.

Medical Society of City Hospital Alumni of St. Louis.—The regular meeting of this Society was held on Thursday, April 24, 1902, in the Board of Education Building. Dr. W. T. Coughlin presented pathological specimens; Dr. George Homan reported two contrasted cases of typhoid fever, and Dr. Francis Reder read a paper on "Conditions I Have Found in Operating for the Radical Cure of Hernia."

Yellow Fever in Guiana.—Seventy-two cases of yellow fever are reported in French Guiana, of which number 40 cases have been fatal. At Cayenne, 11 cases, with 5 deaths, have occurred.

Sleeping Sickness in Congo.—An epidemic of this malady rages in Congo; so fatal has it been that in one populous village there remain but 6 women, 10 men, and 1 infant.

Congress of German Otologists.—Will meet at Trier, May 16 to 17, 1902.

Varola in Belgium.—An epidemic of variola exists in Belgium; the disease was, apparently, imported from London in ships landing at Anvers.

German Neurologists and Alienists.—The Neurologists and Alienists of Southwest Germany will meet at Baden-Baden May 24 to 25, 1902.

Cholera in Egypt.—Nineteen cases of cholera and 14 deaths from that disease are reported at El-Tor.

Cholera Among Troops.—Cholera is reported among the American soldiers in the Camarines Provinces of Southern Luzon and elsewhere, but so far few Americans have been attacked, the disease being mainly confined to natives and Chinamen. In Manila there have been 555 cases and 449 deaths from cholera, while the Provinces report 1,599 cases and 1,169 deaths.

Therapeutic Value of Strawberries.—In recent experiments with ten different varieties, M. M. Portes and Desmoulières isolated crystals of salicylic acid and an extract of the fruit yielded an intense violet color with perchlorate of iron, indicating the presence of salicylic acid in considerable quantity.

Lightning Kills 700 a Year.—From 700 to 800 persons are killed annually by lightning in the United States, according to estimates made by Alfred J. Henry of the United States Weather Bureau. In 1900 the Bureau received reports of 713 cases of fatal lightning strokes. In the same year, according to the reports collected by the Weather Bureau, 973 persons were more or less seriously injured by lightning. The loss of life from lightning is greatest in the Ohio Valley and the Middle Atlantic States. If density of population only be considered it is greatest in the upper Missouri Valley and in the middle Rocky Mountain region. Of the 713 fatal cases reported in 1900, 291 persons were killed in the open, 158 in houses, 57 under trees and 56 in barns. The circumstances attending the death of the remaining 151 were not reported. This seems to dispose of the old superstition that the safest place to be in during a thunderstorm is the open country and the most dangerous, under a tree.

To Test New Antiseptic in India.—By an expedition to the disease-stricken parts of India, the effectiveness of benzozone is to be tested. Profs. Victor C. Vaughan and Frederick G. Novy, of the Medical Department of the University of Michigan, leave for Asia about the middle of June. Last winter Prof. Novy announced the discovery of benzozone, an organic peroxide.

Obituary.—Dr. Theodore Walser, one of the oldest and best-known physicians in the borough of Richmond, died recently at his home on St. Marks Place, New Brighton, Staten Island, after a lingering illness. Dr. Walser was sanitary superintendent of the borough. He was a specialist in contagious diseases and an expert bacteriologist. He was attached to the Quarantine station for many years and was a member of the Board of Health in the old village of New Brighton. He was seventy-seven years old. A son, Dr. William C. Walser, survives him.

Dr. Peter R. Thombs, one of the most widely-known physicians in Colorado, died recently at his residence at Pueblo, Col., after an illness of two weeks from a complication of diseases. Dr. Thombs served through the war as an army surgeon with distinction and soon after came to Pueblo. He was one of the oldest physicians in the State. For several years he was Superintendent of the State insane asylum. Dr. Thombs was sixty-two years of age. A widow and one daughter survive him.

Dr. Joseph P. Turner, one of the oldest of the alumni of the University of Pennsylvania, died recently in Trenton, aged seventy-nine years. He held several municipal offices in Trenton and was an active Democratic

orator. He was in the cavalry service in the Civil War. He had been in practice for over fifty years.

Dr. Philip F. Fulmer, one of the wealthiest and most widely-known physicians in Pike County, Pa., and proprietor of the High Falls Hotel at Dingmans, a summer resort, died suddenly of heart disease April 29th, while attending the funeral of his neighbor and lifelong friend, the Hon. Jacob B. Westbrook, who was a Representative in the present State Legislature of Pennsylvania. Dr. Fulmer was born at Stewartville, N. J., in 1830. He was a graduate of Lafayette College and Pennsylvania University.

OBITUARY.

FREDERICK A. CASTLE, M.D.

Dr. Frederick A. Castle, aged sixty years, and one of New York's most widely known physicians, died in Roosevelt Hospital Sunday, April 27th, after a prolonged illness. He was taken ill about six months ago, and a week ago he was removed to Roosevelt, where he was twice operated upon. He died as a result of the second operation.

Dr. Castle was a medical student in Bellevue when the Civil War began. Without waiting to take a degree, he with a number of other young men, many of whom afterward became well-known physicians, formed the Medical Cadet Corps, and were sent to the front as a part of the Medical Department of the army. He later left this organization and served for two years in the Navy. Toward the close of the war he returned to Bellevue, where he was graduated.

Dr. Castle became widely known in the profession through his editorial work in connection with numerous medical journals and magazines. For a time he occupied the chair of therapeutics at Bellevue, and was later visiting physician at the Presbyterian Hospital. He was largely interested in the building of the Academy of Medicine, in West Forty-third Street, and was once its treasurer. Among the clubs of which he was a member are the University, the Grolier, and the Loyal Legion. Outside of his profession he was interested in bookbinding and designing, and as a member of the Grolier Club he planned its "Dutch Room."

CORRESPONDENCE.

FOREIGN SOCIETIES.

British.

LOW PROTEID METABOLISM—POSTURAL TREATMENT OF BRONCHIAL DILATATION AND CATARRH—BAZIN'S DISEASE—APPENDICITIS WITH UNUSUAL COURSE—CEREBROSPINAL RHINORRHEA—CULTIVATION OF THE TUBERCLE BACILLUS—UNUSUAL CANCER—SUBCUTANEOUS PUNCTURE OF JOINTS—VACCINIA—TYPHOID FEVER—EMPHYEMA.

THE scientific societies of the United Kingdom have all had numerous meetings since our last report. They are as active as possible at this season of the year and the past month has been more busy than usual. V. HAWLEY and F. GOODBODY, at the Pathological Society of London, March 5, 1902, presented a collaboration on the subject of low metabolism. The popular belief is that when large eaters remain thin it is because the large amount of food passes through them unaltered. The authors' contended that this is not correct. Certain individuals have a low metabolism and need less food than others. Three cases were described in which the patients were kept under similar conditions, namely in bed, with only massage for exercise. The diet, the urine, and the feces were all carefully analyzed. The

feces were divided into different periods, by means of large doses of charcoal. A woman weighing seventy-two kilograms was found to live on a very small amount of food, in fact, as little as one pound of mutton in twenty-four hours. During the seven days of observation she lost only two kilograms in weight and during the first six days only one. In this period the total nitrogen in the food was 12.16 grams. The average output of nitrogen was 13.51 grams, showing a loss from the tissues of about one gram a day. During the period of seven days she had only five movements from the bowels and the doses of charcoal showed that it took from sixty to seventy hours for them to pass through the body. The quantity of nitrogen in the feces was extremely small, being only 0.48 grams. A man on a diet of one pound of meat in a day, taking 14.72 grams of nitrogen, excreted 22.71, losing therefore seven grams of nitrogen. During four days of observation this man lost two kilograms in weight. The nitrogen in the feces was 0.66 and the fat 2.43 grams. The woman was now put on a very small diet during two periods of five days each. In the second period she took 6.08 grams of nitrogen, the diet containing only 4.16 calories per kilogram. During this time she passed 7.32 grams of nitrogen per diem in the urine, so that during the five days there was a loss of one gram of nitrogen per diem from the tissues. During the two periods in which she took this remarkably small diet her average weight was for the first 66.8 kilograms and for the second 66.5. The loss in weight was very small indeed.

W. EWART, at the Clinical Society of London, February 28, 1902, exhibited a case illustrating the treatment of bronchial dilatation and bronchial catarrh by posture and respiratory exercise. The method consists in keeping the foot of the bed raised sometimes to considerable height, while the shoulders are low and the head upon a pillow. The first case in which he carried out this treatment has been published. Other cases, including phthisical patients, have been under this treatment. The method, however, had been previously thought of and described by Quincke. The patient exhibited was a man twenty-one years old, suffering from bronchial dilatation.

H. L. BARNARD, at the Harveian Society of London, February 20, 1902, showed a young woman the subject of Bazin's disease, with ulcers on her legs for the last five years. They appeared first as nodules under the skin, like erythema induratum, burst, broke down, formed little round ulcers of shilling-size, punched out extraordinarily like specific ulcers, from which differentiation is difficult. They are supposed to be tuberculous and he so regarded this patient who had had tuberculosis of the spine and left ankle; the latter was cured by plaster-of-Paris dressing. The ulcers referred to left a pigmented scar very like that after syphilitic ulcer. Hutchinson had pointed out that such subjects are singularly predisposed to chilblains. The present patient had never had chilblains or enlarged glands of the neck. In a similar case he had endeavored to find the bacillus, but had failed. Injection of the substance into guinea-pigs and rabbits did not produce tuberculosis.

Campbell Williams, in the discussion, said he thought there was no doubt about the diagnosis, but one point about the case was abnormal, namely, its symmetry. In the original description of the disease Bazin said he had never seen it above the knee—an obvious mistake because it might even be limited to that region. Recently he had seen a woman with a patch on each knee on the vastus internus. The lower part of the limb was free. It might occur on the hands also. The present case was typical because it had ulcerated. Occasionally resolution occurs without ulceration, leaving a

fawn-colored depression. The lesions are often mistaken for tubercle, more frequently for syphilis. Tonics, cod-liver oil, warmth, antiseptics, and cleanliness are the indications. Removal to a warmer climate usually cures.

W. B. BELL, at the Liverpool Medical Institution, February 27, 1902, related a case of appendicitis of unusual course. Operation revealed an empty abscess cavity. The stump of the appendix was removed from the cecum and its apex from the ileum to which it had adhered. Here was a large perforation through which the abscess had discharged into the bowel. He closed the perforation, packed the cavity and saw his patient recover without interruption.

C. F. LARKIN read notes of the case of cerebrospinal rhinorrhea. The fluid escaped from a fracture of the base of the sphenoid bone. The patient lived twenty-seven days after receiving his fracture of the skull and then died of septic meningitis.

E. J. McWEENEY, at the Royal Academy of Medicine in Ireland, February 21, 1902, demonstrated a case of tuberculous pleuropericarditis, with unusually numerous tubercle bacilli, so that direct cultures on Loeffler's serum gave abundant growths. He exhibited these primary cultures showing the lichenoid appearance of the colonies and their characteristic tendency to grow on to the glass. Secondary cultures on glycerinated potato, luxuriant, of light reddish hue, with the bacilli forming a scum on the dilute glycerin, were shown. He also demonstrated tertiary cultures on glycerin agar, which were succeeding whitish in color. The patient was a man, fifty-five years of age, who suffered from tuberculous pleurisy of the left side, tuberculous bronchopneumonia on the right side, but without lesion of the pleura of the right side; tuberculosis of the superior pericardial glands; thickening of the parietal layer of the pericardium, with some caseation; enlargement of the spleen to a degree appreciable during life, with a studding of it by yellowish, necrotic masses, larger than miliary tubercles and very abundant in the germs. In the affected parts of the pericardium the bacilli formed masses large enough to be seen with a low power in the stained preparations.

T. A. HELME (Manchester), at the North of England Obstetrical and Gynecological Society, February 21, 1902, showed the following specimens of unusual cancer: (1) A carcinoma of the neck of the uterus with double pus-tube, removed by the vagina from a nullipara, twenty-three years old, married twelve months, infected by her husband with gonorrhea and suffering from the symptoms of menorrhagia and discharge for about six months. The points of interest in the case are the early age for cancer, its occurrence in a nullipara, and its association with gonorrhea. Microscopically the growth was columnar carcinoma. (2) A polypoid carcinoma of the body of the uterus, removed by the vagina from a virgin, forty-one years old. The operation was difficult because of the smallness of the vagina and the perineum had to be incised and the front wall of the womb cut through. The ligaments were clamped. This growth was adenocarcinoma, originating on the right side of the body of the uterus forming a large polypoid mass, which protruded into the vagina. (3) A solid ovarian tumor, primarily (?) tuberculous peritonitis with ascites. Wasting, ill health, enlargement of the abdomen, evening rise of temperature, morning subnormal temperature, with the signs of considerable free fluid in the abdomen and those of a solid ovoid tumor in the right ovarian region, and normal uterus were discovered sometime before the operation. The history, general condition, and physical signs suggested tuberculosis of the peritoneum rather than simple ascites caused by the tumor. The abdomen

was opened and the fibroma of the right ovary removed, showing no evidence of malignancy. The whole posterior surface of the right broad ligament and of the uterus was covered with thick, cheesy tuberculous-looking material, and the peritoneum of the pelvis showed the usual signs of tuberculosis. Both Fallopian tubes appeared to be healthy. The ascites fluid was removed and the abdomen was closed, and at the present time, nine months after the operation, the patient appears to have entirely regained her health.

T. P. TEALE, at the Leeds and West Riding Medico-Chirurgical Society, February 28, 1902, read a note on the relief of distended joints by the establishment of subcutaneous leakage. The first case on which this principle was carried out was one of acute distention of the knee with intense pain. This he punctured with a narrow knife expecting to find pus. As the fluid which escaped along the blade was but chiefly turbid synovial fluid, instead of opening and draining the joint externally, he made three or four punctures half an inch long into the synovial cavity. The result was that the fluid escaped into the tissues outside of the joint and was thence harmlessly absorbed. There was at once relief of pain and a rapid recovery followed. Since then he has repeatedly and successfully done this operation. J. Hardy of Manchester has written to him that in his own experience several times in early disease of the hip, this procedure had caused relief, but he had not continued to use it because most cases to which it is applicable do better after early excision; because the disease in the majority of these cases begins in the subchondral layer of bone, and then affects the synovial membrane.

DR. SIMGAR, at the Winsor and District Medical Society, February 26, 1902, read a paper on the results of vaccination of 1,060 adults, showing the number of vesicles in primary vaccinations, in secondary vaccinations and in tertiary or later vaccinations and in the subjects of smallpox. The percentage of successes was recorded and all failures and doubtful results noted. Stress was laid on the want of uniformity in the strength of lymph on the market. The clinical aspect of revaccination was the chief aim of the paper. Most cases present little constitutional disturbances and the vesicles run a perfectly normal course, but in a few the following were noted: Papules from dressing irritation in 24 cases, pustules spreading beyond the vaccinated area in 6, boils in 21, carbuncle in 1, abscesses in 4, relapse of old previous skin trouble in 1, eczema in 3, herpes in 1, erythema in 23, auto-inoculation in 5, and generalized vaccinia in 1. The high percentage of successes among patients who had had smallpox was noted and conclusions were drawn, without describing a staphylococcus which had been grown from the lymph. The paper concluded with an expression of the hope that a specific agent of vaccinia might soon be discovered, so that a standardized lymph, free from extraneous organisms, might be used. E. S. NORRIS read a similar paper on 1,000 cases of vaccination and revaccination, with an account of the smallpox epidemic of 1876 witnessed by him at the Homerton Fever Hospital. The conclusions were that neither vaccination nor revaccination was absolutely preventive against an attack of smallpox, but were operative in very many cases. Tables were given showing the incidence of smallpox in the vaccinated and unvaccinated respectively. Norris's experience agrees with the common knowledge that smallpox is very fatal among unvaccinated infants. The value of good marks compared with bad marks was next discussed, adding the point that the value is more manifest after puberty, for in early life almost any kind of vaccination might suffice to obviate the worst effects of smallpox. The question whether vaccinia and variola

could run their course together was next entered into. The paper ended with an allusion to the very high protective influence exerted by revaccination.

A general discussion on the subject of typhoid fever was held at the Bradford Medico-Chirurgical Society, February 18, 1902, the public health aspect of the disease being introduced by A. Evans, its pathology and diagnosis by F. W. Eurich, and its treatment and complications by H. J. Kemble. Evans said that in Bradford from 1897 to 1900, 934 cases occurred in houses, of which 737 houses were furnished with midden closets and the others with water-closets or "tipplers." He exhibited Pettenkofer's chart of Munich, in which the area of subsoil water and the prevalence of typhoid fever were represented. Evans expressed the opinion that this theory was not proved and that the decrease of typhoid fever in Munich was due to the general improvement in the sanitary conditions of the housing and living.

Eurich dealt with the bacteriological diagnosis of typhoid fever, described the characteristic culture and morphology of the bacillus typhosis, and added that the direct bacteriological test is impracticable for diagnostic purposes. He alluded to the direct examination of the splenic blood obtained by aspiration and condemned it as dangerous and uncertain. Widal's test was described and noted as trustworthy only if a proper proportion of serum and bouillon culture were present, stated to be about 1 to 40. Dr. Campbell, speaking of treatment, said that up to the present no very satisfactory result had been obtained from treatment with antitoxic sera. Drug treatment was divided into three classes: (1) Intestinal antiseptics; (2) cardiac and respiratory stimulants; (3) antipyretics. The last should be condemned, except in rare cases. Stimulants should be given according to general indications. Strychnine applied in large doses for a short time in collapse, digitalis in small doses for diuresis and cardiac support; alcohol is the all-round routine stimulant. Systematic baths give a lower percentage of mortality than others, but unfortunately can be carried out only in hospitals or where there are many attendants. In the dietary milk is the best all-round article. Dr. Dunn related the experience with typhoid fever among the troops in South Africa. He said 30 per cent. of the cases showed no eruption. Milk was usually not available, except sweetened and condensed, which the patients disliked. They therefore had to use pulped bread, thin bread and butter and beef tea. In ten days or less from the time that the temperature was normal the soldiers usually shifted for themselves and had the ordinary diet of bread, biscuit, jam and corned beef. Relapses were not frequent and deaths from perspiration uncommon.

Dr. JACOB, at the Nottingham Medico-Chirurgical Society, February 19, 1902, read a short paper on the diagnosis and treatment of empyema. Bronchiectasis at the base of the lung, subphrenic abscess, and pyopericardium might be mistaken for empyema. Aspiration of the pus was necessary for diagnosis. Examination of the pus is valuable. Thick, creamy pus shows meningococcus, thin pus streptococcus, putrid pus a possibility of subphrenic abscess. With regard to treatment, aspiration alone is not trustworthy. A removal of a piece of the ninth rib just outside the angle of the scapula and free drainage, he had found most successful. Tuberculous cases never do well if opened and drained, because they become infected by other organisms and death is hastened. The value of treatment by means of irrigation and baths of a weak solution of boric acid was stated. The application of Estlander's operation for chronic cases was noted and suggestions regarding technic offered.

PRESERVATION OF SUPRARENAL SUBSTANCE.

To the Editor of the MEDICAL NEWS:

DEAR SIR—Perhaps it will be of some interest to state that the addition of formaldehyde solution, 40 per cent. fraction of a drop per ounce, will preserve indefinitely solutions of the suprarenal capsules. It will also preserve cocaine and eucaine solutions and the solutions are non-irritating when used locally or hypodermatically. The addition of suprarenal to a cocaine or eucaine solution intensifies its action when used by the infiltration method or otherwise. It prevents the post-operative superficial hemorrhage which is sometimes annoying after the parts regain their tonicity. When the suprarenals are given in conjunction with depressants (notably aconite and gelseminum) full doses may be exhibited and the full physiological effects produced without alarming symptoms. Specimens for microscopical work may be hardened quickly in a formalin solution, 30 to 60 drops to the ounce, a section made and mounted in Canada balsam which serves for all ordinary purposes. The specimen does not become blanched or shriveled, as when alcohol is used.

CHAS. W. HEITZMAN, M.D.

St. Louis, Mo., March 24, 1902.

SOCIETY PROCEEDINGS.

ASSOCIATION OF AMERICAN PHYSICIANS.

Seventeenth Annual Meeting, Held at Washington, D. C., April 29 and 30, 1902.

FIRST DAY, APRIL 29.

President's Address.—Dr. James C. Wilson of Philadelphia made a few appropriate introductory remarks, saying that a glance at the papers of his predecessors, as published in the Transactions of the Association, would offer an excellent epitome of the development of medical science during the years of the organization of the Association. As many of the members had been interested in hospitals and hospital management, it was but natural that many of the communications bore on that side of medical questions. The evolution of American medicine and the medical practitioner of this country could be traced as one read such a volume and, moreover, the history of the foundation of medical societies such as their own was the history of the growth of the science in this country. Over one hundred and fifty years ago the first societies were founded. At that time there were two, now since dead, one in Boston and one in New York. The now oldest living medical society was founded in Litchfield, Connecticut, in 1765, and in the following year, the second oldest, that of New Brunswick, New Jersey. The Massachusetts Medical Society effected a permanent organization in 1781, the College of Physicians in Philadelphia in 1786, and from those early days down to May, 1847, many local societies came into being. At that later date the American Medical Association came into existence. This society has been able to bring about much needed union. It has made of the medical profession of this country a united brotherhood and the feeling is expressed that the time may soon come when, by the agency of the united medical men of this country, the beauty, the nobility, and the utility of the work of the medical practitioner may be recognized and the efforts made for advance in medical education may receive their due reward. Some defects were pointed out which marred the otherwise high character of the American Medical Association. There had hitherto been a tendency to regard local interests which had resulted in a stultification of its work and the raising of

a school of medical politicians. By the new reorganization it is to be hoped that this old order of things will pass and that the onward problems of medicine as a science and as an art will have their due position in the American Medical Association. In the meantime the necessity for the discussion of highly technical questions has given rise to the development of our National societies and by the gradual coalescence of bodies of specialists the Congress of American Physicians has come to represent a body of practitioners and laboratory workers engaged in the investigation of the deeper technical problems of medical research, and before which only really valuable and original contributions may be offered to the stock of medical experience. Dr. Wilson referred to the stimulating influences that society organization had upon the medical practitioner and the development of discussion and the bringing out of the younger men what best was in them.

Necrology.—During the past year three of the charter members of the Association died, and brief mention was made of their activities and their part in the history of the Association. These were Dr. John T. Metcalfe (see MEDICAL NEWS, p. 276); Dr. W. W. Johnston (see MEDICAL NEWS, p. 616); and Dr. Meredith Clymer (see MEDICAL NEWS, p. 801).

Toxicity of Ammonium Compounds.—Drs. B. K. Rachford and W. H. Crane of Cincinnati have sought to determine in studies made on mice the comparative toxicity of different salts of ammonium, sodium, potassium, calcium and magnesium combined with various acid ions, organic and inorganic. As far as the ammonium compounds are concerned, they were all found to be toxic notwithstanding their acid combinations. In toxic doses, they increase the reflex excitability of the spinal cord, bring about tonic and clonic convulsions, diminished respiratory activities and death. The acid portion of the molecule seems to have little influence on the result, although the organic acid combinations are less toxic. Ammonia compounds taken by the mouth are much less toxic, since the ammonium ions do not enter into the general circulation, because the compounds are broken down into urea by the activities of the liver. Sodium compounds are not very toxic. They are not often called upon in the body metabolism to neutralize the morbid acids forms and thus rarely spare the ammonium compounds. In therapy, however, notably in diabetes mellitus they may be very efficient aids to overcome the effects of acid intoxication. Potassium compounds may be used by the body as neutralizants, but their rôle is not a large nor an important one. They are about one-half as toxic as the ammonium compounds when in combination with the same organic acid. In therapy they are not to be recommended, since they substitute for one poisonous base, ammonium, another, potassium. Little need be said of the calcium and magnesium compounds.

Toxicity of Acid Ion.—So far as the author's results can go, it seems probable that the sulphuric, phosphoric, and nitric acid ions are not markedly toxic, and in combinations with ammonium it is this base which is the poison. Of the organic acids, lactic, sarcosolactic, oxybutyric acetic, etc., these are feebly toxic, whereas oxalic acid is comparatively poisonous.

In discussion Dr. C. A. Herter of New York suggested that a refinement in technic which made use of equi-molecular solutions would be advisable and that it was not justifiable at the present time to attribute the toxic action solely to the ammonium compounds.

Tetanus Toxin in Infected Horse.—Drs. B. M. Bolton and Carl Fisch of St. Louis had occasion by reason of the recent St. Louis tragedy to investigate the amounts of tetanus toxin that may be found in the blood of tetanus infected horses. It is known that tetanus

toxin may be found in the blood of an infected horse at a particular time and then it disappears very rapidly. In rabbits this is also true, as is the reverse proposition. The rabbit seems to be able to lock up a large amount of tetanus toxin, whereas the guinea-pig can do but little in this line and what little toxin is neutralized is usually made so in the nervous tissues. No toxin was found in the blood or the spinal fluid of any of the poisoned children. In a series of experiments on horses it was demonstrated that tetanus toxin could be found.

Acid Resisting Group of Bacteria.—Drs. A. C. Abbott and N. Gildersleeve of Philadelphia have made a series of studies on the properties of these organisms which seem closely allied to the tubercle bacillus. These micro-organisms have been found in timothy, in butter, in cheese, and in many excretions, but, according to Dr. Abbott, they may be readily differentiated from the tubercle bacillus because of their lessened resistance to the action of the inorganic acids. The tubercle bacillus will stand stronger acids and for a longer period of time without decolorization. Thus, with 5-per-cent. sulphuric acid the tubercle bacillus will resist decolorization for twenty minutes and strong 15-per-cent. nitric acid five minutes, while all of these related bacteria will withstand the former acid for only five or six minutes, and the latter strength of acid but a few seconds. It is further brought out that these bacteria are capable of inducing nodular tumors which in some respects are suggestive of the tubercle of tuberculosis, but no one nodule ever has all the typical characteristics, whereas if every tumor be studied practically every change will be found. Caseation is rare in these experimental tumors. Another point of difference may be noted in that the acid resisting group rarely causes pulmonary lesions, whereas its chief pathological activities are exerted on the kidneys. Furthermore no reaction to tuberculin has ever been obtained in animals infected with members of this group. The authors are disposed to regard these forms, with the tubercle bacillus, as a distinct group, more closely allied to the actinomycetes than to other forms of plant life.

In discussion Dr. S. Flexner of Philadelphia pointed out the fact that the histology of the tubercle caused by this group of organisms is quite dissimilar from that brought about by the bacillus tuberculosis. The giant cells resemble those of foreign body giant cells, and the general type of tissue more closely resembles granulation tissue than it does true tubercle tissue.

Cytotoxin Intoxication and its Histology.—Dr. Simon Flexner of Philadelphia referred to the recent work of Bordet, Ehrlich, Metchnikoff, Van Dungern, and others who have shown that many different body cells when injected into the bodies of alien animals give rise within the cells of the alien animal to cytotoxins which resemble in many of their properties and reactions toxins of bacterial and other origins. One of the most interesting features of these cell reactions is that the cytotoxins formed seem to have a specific action on the cells of the same kind from which they were derived. Thus, injected nerve tissues act on nerve tissue; spleen cells on spleen cells, etc. The histological changes induced have never been studied systematically, or, when so studied, complex organs have been the objects of investigation. Dr. Flexner chose the lymph-nodes as the organs for investigation because of their simplicity and the ease with which they might be studied. He has found that for studies of this character the rabbit is very illly suited, since this animal soon succumbs to the cytotoxins formed. The goose has been found to be a much more resistant animal. If the lymph-cells of a rabbit be injected into the goose the lymph-tissues of this latter animal, independent of the

site of injection, show a marked hyperplasia and other histological alterations suggestive of the changes induced by the use of a bacterial toxin, such as diphtheria toxin.

Heterolysins and Autolysins.—Dr. Flexner further discussed the theories underlying the formation of these bodies and referred to Ehrlich's work on autolysins, i. e., on certain cytotoxins formed within an organ which acts destructively on that organ itself; in which connection he would seek to show the possibility of the setting up within an organ a vicious circle whereby it continually would cause its own modification. On this hypothesis he would explain, for instance, the various sclerotic processes, such as cirrhosis of the liver, which may follow an acute toxemia of an organ, which, after the original cause of fibrous tissue proliferation has been removed, yet nevertheless goes on with the formation of this disadvantageous new tissue.

Terminal Infections.—Dr. Flexner also spoke of one of the factors which might be of paramount importance in the causation of the overrunning of the body just before death by some one or other type of micro-organism—a terminal infection. He thought it possible that some disturbance might occur in the blood serum whereby the immune body complement might be diminished or altogether absent. Thus, it is known that in animals experimented on with bacillus typhosus or coli, that the blood serum which has lost its immune complement in part or in whole, may regain the same and thus protect the animal, whereas in the terminal infections no such restoration can be brought about.

Study of Bacterial Cells.—Dr. Victor C. Vaughan gave an interesting résumé of a series of researches made in his laboratory during the past two years. He made use of his giant culture beds, twenty square feet of growing surface, and was enabled thereby to cultivate enormous quantities of bacteria. These were dried and their chemical constitution and character more carefully investigated. Dr. Vaughan believes that the formation of toxins in bacteria is a product of internal cell activity, a synthesis, and is not a result of the splitting up of the food on which the organisms grow. The first study reported on was the character of bacterial pigments. These are fatty bodies, lipochromes, similar to higher plant pigments and are capable of making good dyes; he showed some silk handkerchiefs dyed by the pigments of bacillus prodigiosus and bacillus violaceus. He finds that the colon bacillus, anthrax, bacillus diphtheriae, and the sarcinae all contain appreciable amounts of toxins. These are easily obtained from his dried powder by hydrolyzing with sulphuric acid and then dissolving the toxin out by means of water. Alcohol precipitates the toxins. Dr. Vaughan also spoke of the chemistry of the anthrax bacillus. It contains toxic substances in very appreciable quantities, gm. .050 (gr. 1) of which will kill with all the symptoms of this well-known disease. Most of the bacteria studied contains at least two toxins—some contain more. Some are readily split off from the molecule by acids; others not so at all. Dr. Vaughan also elaborated a new theory of the structure of the molecule and showed its relations to the action of antitoxin.

Effects of Tobacco on the Tissues.—Dr. I. Adler of New York found that it was possible to introduce gradually-increasing amounts of extract of tobacco into the food of rabbits which, while at first causing symptoms of nausea, later were taken without any apparent inconvenience to the animal. He sought by such a method of experimentation to determine if tobacco caused any constant lesions which might lead to interpretations referable to chronic tobacco-poisoning in man. At the end of three weeks one rabbit was killed and the tissues examined. It was, so far as could be

determined, normal in all of the organs with the exception possibly of the liver. This organ showed a slight conglomeration of round-cell infiltration about the smaller blood-vessels of the interlobular spaces. At the end of two and one-half months of this feeding it was found that the liver was somewhat larger in size; it was paler, firmer, more granular and somewhat gritty to the knife on sectioning. Throughout there was an increase in the interlobular fibrous tissue, and an increase in the fibrous tissue about the portal veins and bile-ducts. There were no changes in the kidney parenchyma. At the expiration of four months these changes in the liver were more marked. The changes in the blood-vessels began to suggest the lesions of an obliterating endarteritis and, moreover, there were beginning changes in the blood-vessels of the cortex of the kidney. In the heart muscle, slight involvement of the small vessels of the periphery of the heart walls was beginning. The experiments had not progressed beyond this point, but were already showing some interesting analogies on the development of chronic arterial lesions in man.

Hematoporphyria.—Drs. J. Tyson and A. C. Crofton of Philadelphia contributed the details of the history of a patient showing this symptom following the prolonged ingestion of large quantities of sulphonal. Nothing was added to the symptomatology of this form of poisoning. It was determined that at one time in the poisoning at least one-seventeenth of the entire amount of hemoglobin of the body had been destroyed in twenty-four hours.

Pneumococcic Arthritis.—Dr. J. B. Herrick of Chicago said that this complication of pneumonia was comparatively rare. Cave of England had reported the occurrence of some thirty-one instances and Herrick added 21 to this list, making a total of 52. He gave the incidence of the complication as 1 in 1,800 and maintained that trauma was the most probable exciting cause for the location. The arthritis was particularly prone to occur during convalescence, sometimes from one to three days after the crisis; sometimes as late as the fifteenth or twenty-first day. Like gonorrheal arthritis, the pneumococcic form was frequently monarticular and the larger joints, the hip and the knee, were sites of election. Bacterial findings in the joints was the only true method by which to establish the diagnosis. Spontaneous recovery was the rule with the serous effusions, although the prognosis was at all times extremely grave, as there was necessarily a general bacteremia. In those patients in whose joints there were serous effusions only, aspiration was usually sufficient to bring about recovery; in those with purulent joints, surgical opening and drainage was indicated.

Dr. William Osler spoke of three types of these cases, namely, (1) localized arthritis; (2) arthritis associated with pneumonia, and (3) general pneumococcic septicemia. He presented the history of a clinical case.

Pathology of Herpes Labialis in Pneumonia.—Dr. W. T. Howard, Jr., of Cincinnati reported a case of croupous pneumonia, dying on the sixth day of the disease. Three days before death there was marked herpes of the upper lip and of the nose, most marked on the left side. Histological study of the Gasserian ganglia and of their branches showed as follows: In the left ganglion, there was marked congestion of the veins about the superior maxillary nerve and its origin, with hemorrhage into the capsule and into the part of the ganglion nearest this branch. Here, in addition to the hemorrhage there was cellular infiltration and proliferation, with compression, and destruction of some of the ganglion cells. The right ganglion showed congestion of the same veins, without hemorrhage, but with some cellular infiltration of the ganglion tissue near the

superior maxillary branch. No degenerations were found in the roots of the fifth nerves or in the superior maxillary nerves. In a second case of croupous pneumonia, three days before death, there was a marked herpes zoster in the sixth dorsal region of the left side. A similar eruption was found on the day of death on the left side of the abdomen in the eleventh dorsal region (Head). Only the lower portion of the cord and the lower spinal root ganglia could be removed at the autopsy. Sections of the left eleventh dorsal ganglion showed both congestion of and hemorrhage into its capsule. At one side of the ganglion the capillaries were congested and a few red blood-cells were present in the interstitial tissue. In one small area there were a few disintegrated ganglion cells with slight round-cell infiltration. In other portions of the ganglion numerous amyloceous and hyaloid bodies were found in lymph-spaces and apparently in ganglion-cell spaces. Degenerations could not be demonstrated either in the nerve, the posterior roots, or in the spinal cord. Histologically the lesions in the skin were identical in the two cases. As the lesions in the ganglion and in the skin in herpes labialis and nasalis, and in herpes zoster of pneumonia, are the same, and as they have the same pathology as ordinary herpes zoster, it seems probable that the various forms of herpes are identical.

Hodgkin's Disease with Recurrent Fever.—Dr. H. F. Vickery of Boston gave a series of notes on a clinical case of this affection. During the febrile period of the disease the glands were swollen and tender, but there were not any indications of a spreading of the glandular involvement. There were no marked blood anomalies. There had been six febrile periods. On examination of some of the glands a mixed-cell sarcoma was found. Dr. Vickery thought that it was not improbable that some specific cause might be found for this disease. He was not yet prepared to believe that tuberculosis was the main underlying lesion.

Dr. M. Allen Starr said that every case of such a rare and obscure affection was worthy of record and presented the history of a case seen with Dr. Kinnicutt. In this patient's history there was family tuberculosis. The glands of the neck had been removed by Dr. Bull and had been found tuberculous. The febrile attacks would extend over a period of from seven to ten days and the febrile intervals would be from ten to forty days. Other glands were removed; these were non-tuberculous. With the febrile attacks there were exhaustion, malaise, nausea and headache. The physical examination was usually negative. There was a slight enlargement of the spleen. The blood-count showed 4,400,000 red cells, 5,800 white cells and no marked abnormal features. So far as could be learned there was no tuberculosis at the time of examination.

Splenic Anemia.—Dr. William Osler of Baltimore said that he had desired to bring out if possible the existence of a distinct type of disease, which might be set apart from any of its congeners by the presence of a distinct and clear-cut syndrome. The symptoms were anemia, of a chloro-anemic type, marked chronicity, extending over many, many years, with distinctly enlarged spleen; hemorrhage from the stomach, at times pigmentation of the skin, and, in the later stages of the disease, the development of an ascites or a cirrhosis. He reported a classical history of a case which would represent the type. With reference to the subject of chronicity he said that the disease might exist during a period of at least ten or twelve years. The longest record was one of twenty years. The spleen might be as large as a leucemic spleen with no increase in

the size or number of the general lymphatic tissues. The blood-changes were of the chloro-anemic type. There was a leucopenia with greatly reduced amounts of hemoglobin and with a comparatively normal number of erythrocytes. The hemorrhages were usually into the stomach, occurring sometimes early and sometimes late and again at times in other locations. This hemorrhage seemed to be explained on the ground of the close anatomical relationship of the stomach to the enlarged and engorged spleen. He had noted pigmentation of the skin in seven patients. It was of a peculiar grayish tint suggestive of argyria; sometimes it was mottled. In the later stages of the disease involvement of the liver may occur, with increase or diminution in its size, and with jaundice, and ascites. At the present state of our knowledge these anemias are in an extremely unsatisfactory condition so far as accurate demarcation is concerned. They make a very motley group. They are to be delimited from the pernicious anemias, cirrhosis, syphilis of the liver, Hodgkin's disease, and a number of other conditions. Their treatment is far from satisfactory. Splenectomy has seemed to prove of service for some patients, but not in others.

In the discussion Drs. Musser and Billings reported cases, considering the disease rare. Dr. Cabot gave the results of his experience and was inclined to the belief that no special group, such as Dr. Osler might seek to pick out, really existed as a disease entity. The low relative percentage of hemoglobin had but little significance in his mind. The low white count was peculiar, but was not sufficiently so to be of service in making a type. Dr. Stengel gave the histories of two patients suffering from what has been termed Banti's disease.

Intestinal Parasites and Anemia.—Dr. Wardell Stiles of Washington added to the discussion a number of observations made upon intestinal parasites in cattle and urged the advisability of more frequent and routine fecal examination in all patients suffering from grave anemia. In cattle enlarged spleens associated with anemia are not uncommon, and are due to infection by a number of parasites. The encysted *Strongyle*, *Strongylus contortus* and *Strongylus (Uncinaria) radiata* are among the commoner parasites. *Uncinaria* is related to *Anchylostoma* and *Uncinariasis*, or what was heretofore termed *Anchylostomiasis*, is by no means a rare disease. Moreover, Dr. Stiles believes that the form of *Uncinaria* found in this country and in the Philippines is a new species, named by him *Uncinaria Americana*, and is not the old *Uncinaria (Anchylostoma) duodenale* of Europe. Therefore, this disease he believes is endemic in this country and has been here for a long time, but unsystematic research, more particularly of the feces, has permitted it to go unrecognized. This disease has been reported in Virginia and in Texas and gives a number of the classical symptoms under discussion in Dr. Osler's paper.

Albumosuria and Pernicious Anemia.—Dr. H. F. Vickery of Boston reported the history of a man, aged forty-seven years, with albumosuria and having the general course of a case of pernicious anemia. There was sudden death by syncope and no autopsy was obtained.

Dr. Jacobi in discussion said that the relationship was probably accidental. Albumosuria in slight grades was not at all uncommon in a large number of conditions, especially if there were purulent discharges.

Acute Hemorrhagic Polyomyositis.—Dr. W. S.

Thayer of Baltimore presented the details of the history of a case of this affection. He gave the varied classifications of this comparatively rare affection dwelling more particularly on that given by Lorenz. The left arm was the site of a large amount of edema and the pectorals of the same side were also affected. In addition there were extensive hemorrhagic infiltrations within the muscles and about the muscles. The varied etiological factors were considered, but the case under consideration was inexplicable.

Sunstroke in Philadelphia.—Drs. M. J. Lewis and F. A. Packard gave an extremely interesting paper on the cases of sunstroke occurring in Philadelphia and treated at the Pennsylvania Hospital during the summer of 1901. In all some ninety-one cases are reported. Most of these patients were stricken between the hours of eleven and five, the maximum number of insolation strokes occurring between the hours of three and five in the afternoon, showing the aiding influence of muscular work added to the heat in bringing about this condition. Of these 91 cases, 31 occurred in females, 60 in males, solely an indication of man's greater exposure. The temperatures recorded ran from 105 to 113° F.; none died with temperatures of 106° F. or less; 8 patients had temperatures of from 106 to 107° F., of whom 2 died; 6 had temperatures of 107 to 108° F., of whom 1 died; 8 had temperatures of 108 to 109° F., 1 died; 2 had temperature of 109 to 110° F., 1 died; 8 had temperatures of 110 to 111° F., 3 died; 3 had temperatures of 111 to 112° F., 3 died; 1 had a temperature of 113° F., he died. Many of the patients had tonic convulsive seizures. These were quite distinct from the attack of epilepsy or of uremia; fourteen patients had such attacks, and in all the temperature was 106° F. or over. Unconsciousness was universal if the temperature exceeded 106° F. The state of the pupils varied; in 5 they were contracted; in 2 with temperatures of 110° F., they were dilated. In 4 albumin was found in the urine. The previous habits of the patient with reference to alcohol seemed to play an important rôle; 50 per cent. of those with alcoholic habit died; yet 50 per cent. died in whom no such history was obtainable. The blood of 17 patients was examined and showed no regular features. In general there was a slight increase in the red cells; the leucocytes varied widely, an increase in the polymorphonuclear cells alone being noted.

Treatment of Sunstroke.—In patients with a temperature of 102° F. or under, little or no treatment was necessary. In those with temperatures of 102 to 106° F., stimulation, the ice-cap, and rubbing with ice were necessary. In the higher grades of temperature additional agents were tried. Bleeding did not seem to offer much relief for those with the higher grades of temperature, yet no harm could be said to have followed this procedure. Hypodermoclysis of physiological salt solution was found to be too slow. Intravenous injections were tried in 10 cases, of which 4 died. No accurate data could be obtained, but the impression was gained that such a procedure never did any harm and probably did some good. Saline solutions intravenously, rubbing with ice and stimulation were advised as the best routine for high temperatures.

Gelatin as a Hemostatic.—Drs. A. Stengel and D. L. Edsall of Philadelphia presented the results of a series of clinical and experimental studies on gelatin as a hemostatic in bleeding, in typhoid fever, 12 cases; from gastric ulcer, 3 cases, and in phthisical hemoptysis, 4 cases. The authors could not

come to any definite conclusions from their studies, but the impression was gained that, notwithstanding certain grave objections to the method, it was justifiable and to be recommended. In attempting to explain why such a good result could reasonably be hoped for they considered, first, the increase of calcium that might be added to the blood, which substance, taken into the blood, is known to bring about increased powers of coagulability. They thought that this element might be considered of minor import. Agglutination of the red cells by the gelatin was considered, but was rejected. Slowing the blood current also seemed untenable as an explanation. Increased acidity of the blood is not a factor. The results, if obtained, are probably due to a combination of the various factors rather than to any one.

Dangers in Gelatin Injections.—Certain grave objections were considered. At times emboli might form in the smaller vessels; these, becoming infected, not infrequently break down and form abscesses. Injury to the kidneys may result from the excretion of the gelatin. Pulmonary edema may be induced. It is not uncommon in animal experimentation. Pain is usually an accompaniment of these injections.

In the discussion the consensus of opinion did not seem to favor the procedure highly.

Hemolymphglands.—Dr. Simon Flexner read a paper on this subject for Dr. A. S. Warthin of Ann Arbor. These are small glands of a redder color than ordinary glands, generally very small and difficult to find in the human body after death as the blood drains out. The sinuses of these glands are filled with blood instead of with lymph. They bear the relation to ordinary glands of 1 to 5 or 10. Dr. Warthin has made an exhaustive study of their histology, especially in animals. They can be separated into two kinds—those having the spleen and marrow respectively as their prototype. These two forms were very plainly shown by slides. Between the two are all grades of transition. Small lymph-nodes are also contained in these glands, as in ordinary lymph glands. Dr. Warthin believes that under normal conditions these glands have nothing to do with blood-formation. In diseased conditions they are supposed to be active, possibly acting vicariously for the spleen or bone marrow.

Dr. Bond showed slides of blood containing mitotic corpuscles.

Anguillula Aceti.—Dr. Billings reported two cases of anguillula aceti in the urine and showed slides. Dr. Stiles reported one case. The presence of these parasites in the urine is difficult of explanation. The old Eastern custom of using vaginal douches of vinegar to prevent conception was mentioned as a possible source, transmission to the male occurring during coitus.

Origin of Vaccine Bodies.—Dr. Ewing showed slides to demonstrate his theory of the origin of vaccine bodies, the question being suggested by the fact that the number of vaccine bodies present has much to do with the degree of hemorrhagic small-pox. In cases of this variety red cells in various stages of degeneration were found enclosed in epithelial cells, many of these fragments being scarcely distinguishable from vaccine bodies. The relation of red cells and vaccine bodies in cases of ordinary variola was then studied and practically the same conclusion was reached, viz., that vaccine bodies are not parasitic in nature, but are fragments of red blood-cells. Contrary to some other observers

Ewing believes the fate of the vaccine bodies to be disintegration instead of vacuolization.

SECOND DAY—APRIL 30TH.

Prognosis of Pleurisy with Effusion.—Dr. R. C. Cabot of Boston sought to reinvestigate this question, since it has been held for so many years that so-called idiopathic pleurisy with effusion was almost always tuberculous. During the past twenty years 300 cases of pleurisy with effusion have been entered in the books of the Massachusetts General Hospital. Of these Dr. Cabot was able to obtain subsequent histories in 152 cases. In all of these at the time of entrance into the hospital the diagnosis was certain, since they had been tapped and in none was a diagnosis of tuberculosis thought possible after careful physical examination. The results showed that 21 patients were in sound health after from fifteen to twenty-one years, after from ten to fifteen years, 23 patients, and after five to ten years, 36 patients, or a total of 80 patients in sound health. Of those not out so long as five years, there were 4 in good health after four years, 7 after three years and 6 after two years. Those known to have contracted tuberculosis and died were 23 in number, one sixteen years later, 4 ten to fifteen years, 8 five to ten years, 10 one to five years. Fourteen died of other diseases. (Thus, more than 80 per cent. were in good health after the pleurisy.) Fifteen per cent. developed tuberculosis of the lung, but only 3 per cent. of these did so within two years, hence it does not seem probable that the relation between the pleurisy and the tuberculosis is a very immediate one. The type of tuberculosis observed is of the mild type, the progress of the disease being a slow one. Six of the patients with tuberculosis are still alive. However, a very rapid and fatal form of the disease may occasionally arise.

Influence of Family History.—This does not play an all-absorbing rôle, although 25 per cent. only of those in health had a family history of tuberculosis while two-thirds of those who died had some family tuberculous taint. The family history plays an important part in the prognosis therefore. The character of the physical signs is of little service in prognosis. Recurrence of the pleurisy was not of common occurrence; reaccumulation of the fluid was also rare. Dr. Cabot would thus reverse the old bad prognostic omens of pleurisy with effusion and give a hopeful prognosis if there be no family history of tuberculosis.

English Statistics not as Favorable.—Dr. A. Harris of Manchester, England, said that for the English population the prognosis was by no means as favorable. This opinion was reflected in the decisions of the English life insurance tables where signs of an old pleurisy or history of the same made the applicant pay a higher rate or excluded him entirely if he had had a pleurisy within five years of the time of application.

Dr. Jacobi said that there were many old pleurisies which were recovered from, and he was of the impression that Dr. Cabot's results were in accord with his views.

Bacteriology of Empyema.—Dr. C. F. Withington of Boston gave a lengthy paper on the forms of bacteria found in patients with empyema in some 135 cases occurring during the past six years. Of these 71 were left-sided and 64 right-sided. The diplococcus lanceolatus was found in 28 patients, of whom 8 died; the streptococcus was found in 35 patients, of whom 9 died; a mixed infection of these two organisms occurred in 18 patients, of whom 2

died. Thus the infection by either the streptococcus or the diplococcus was more serious than by their admixture. In the great majority of cases pneumonia is an antecedent of the empyema and lobar pneumonia is the main type of the disease. Pus was detected in 95 per cent. of all the cases before the twenty-fifth day, sometimes as early as the sixth day. Many pneumonias were secondary.

Treatment and Results.—Of 20 patients unoperated on 10 recovered and 10 died; of 115 operated on only 40 died, thus making a percentage of 50, as against 29 in favor of the operative treatment of the disease. Of those who died, 26 per cent. had the streptococcus as a cause of the empyema; 11 per cent. died with the mixed infection, and 28 per cent. died from infection by the diplococcus. The prognostic feature of the type of infection is of secondary value, yet some importance should be attached to the purer infections. Thorough opening of the chest usually gives better results than does simple drainage.

Dr. Welch spoke of the difficulties of differentiating these two different forms of micro-organisms, and Dr. Osler spoke of the clinical fact that it seemed that empyema following pneumonia was a more frequent sequel in these later days. What rôle the influenza bacillus played in this it was easier to surmise than to know.

Spontaneous Non-tuberculous Pneumothorax.—Drs. M. H. Fussell and David Riesman considered this comparatively rare accident, giving an analysis of the fifty-six cases which they had been able to find in literature. This affection may occur in good health, although it has always been assumed that a tuberculous lung was a prerequisite. Only 2 per cent. of the cases have occurred in females and most of those in the male sex have been in young adults. The affection very frequently follows severe muscular effort, the symptoms come on with great suddenness, persist for a short time and spontaneously disappear or are immediately dissipated by tapping. One case is reported in literature to have persisted nine years. At times the symptoms may be so slight that the patient goes about his daily work without any inconvenience. There may be a slight dyspnea which at first is apt to be very urgent. On lying down, however, this dyspnea usually disappears. Fever is a rare sign. Inspection usually finds a dislocated apex beat. The coin sound may or may not be in evidence. Metallic tinkling is not a necessary sign of fluid. Aspiration usually relieves immediately and recovery goes on normally.

Drs. Kinnicutt, Solis Cohen, Shattuck, Janeway, Peabody, Brannan and Osler discussed this subject.

Pernicious Anemia Associated with Pulsation.—Dr. A. R. Edwards of Chicago gave the history of an unique case of marked pulsation in the region of the left chest and upper abdominal segment which was mistaken for a case of aneurism, but which gave on autopsy only the signs of an enlarged and adherent spleen and signs of pernicious anemia. No cause was elicited to account for the peculiar swelling pulsation. Dr. La Fleur of Montreal reported a similar experience which he had had.

Healed Ulcerative Endocarditis.—Dr. J. B. Herrick of Chicago said that contrary to old dicta malignant endocarditides sometimes do recover. On grounds of good logic he believes this ought to be so; for (1) there is no reason why such a lesion should not behave like other infections in the body due to the same micro-organisms, and these are known to heal; (2) clinical observation shows that they do heal; while many of the cases on record

are not conclusive on this point, yet certain credence must be given to the belief of careful observers who have seen such cases the world over; (3) there is anatomical proof in old autopsy cases that have recovered from their old endocarditis and have died of other disease. These show the typical heart lesions. Dr. Herrick then gave a brief résumé of the history of a case and laid stress on tonic treatment, advising iron and arsenic and in the acute stages antitoxic serums and perhaps the use of the colloidal-silver preparations, as advocated by Crédé.

Heart in Pregnancy.—Drs. Alfred Stengel and W. B. Stanton of Philadelphia controvert the old French notion that the heart becomes hypertrophied during pregnancy. By a series of carefully devised tracings and readings of instruments devised for the measurement of blood-pressure, they show that Gerhardt's idea that the growth of the fetus, by pressing up the diaphragm forces the apex of the heart upward and outward and that this dislocation has been misinterpreted as a sign of hypertrophy. The tracings in twenty-six cases with careful measurements shows this dislocation, which disappears after parturition. There is, however, a slight irregularity in the contour of the upper right margin of the heart indicative of a slight hypertrophy of the right conus arteriosus. The murmurs which are heard in primiparæ are probably the result of a slight overaction of the right heart. No constant changes in blood-pressure could be demonstrated.

Pancreatic Lithiasis.—Dr. F. P. Kinnicutt of New York gave a report on six cases of pancreatic lithiasis, one of which occurred under his own observation and was recognized during life. This case occurred in a woman, forty-two years of age. The first symptoms were noted in 1888. There was sudden acute pain in the back between the shoulder-blades which moved forward through the body, not around it and lodged in the epigastric region, some nausea and vomiting occurred. There was a severe diarrhea lasting eight or nine hours. Other attacks occurred in 1897 and in 1898. There was neither jaundice nor the passage of calculi. In 1900 she had another attack, with practically the same symptomatology, and six small stones were obtained. These were found to consist of carbonate and phosphate of lime. In so far as the diagnosis of this condition is in question, the symptoms are not clear. Pain is usually present and localized, but a differentiation from biliary colic is not possible. The finding of characteristic calculi is naturally conclusive. Sugar may or may not be found in the urine. If the pancreas be diseased sugar is more liable to be present, but if there be simple obstruction reducing substances are absent in the urine. If there be diminished flow of pancreatic secretions the normal splitting of fats into fatty acids and soaps is interfered with and the presence of unmodified fats and the absence of these acids and soaps makes an important diagnostic feature. Jaundice may be present if the calculi engage so as to press against the biliary ducts and is purely accidental.

Vasomotor Ataxia.—Dr. S. Solis Cohen of Philadelphia referred to his previous writings upon this subject and the recent observations of Savill. Attention was called to the condition of essential instability of the controlling (or toxic) apparatus of the vasomotor nervous system as a large factor in the defective reaction of the individual toward environmental changes, so that persons of the type described exhibit upon slight excitation physical, chemical or psychical, certain phenomena which in other persons require causes of greater moment.

These phenomena depend upon irregular and sometimes widely distributed contractions and dilatations of the capillaries and the smaller blood-vessels, and may be divided into three classes: (1) Those dependent upon excessive relaxation or paresis of the vessels, often with concomitant impairment of cardiac inhibition; (2) those dependent upon excessive constriction of vessels, usually with disturbance of cardiac inhibition, also, but sometimes without definite cardiac phenomena clinically demonstrable; (3) those in which phenomena of the two opposite groups are commingled. The third group is the more common. Graves' disease presents an extreme type of the phenomena of excessive vascular relaxation with paresis of cardiac inhibition. Its exciting causes are various, and its toxicopathologic mechanism undetermined. Raynaud's disease presents an excessive type of vascular constriction, and of it the same may be said concerning undetermined exciting causes and toxicopathological mechanism. Between these two extremes are many varieties differing much in severity and locality of symptoms: simple urticaria; angioneurotic edema; migraine of the spastic type and migraine of the parietic type; anomalous eruptions of various kinds; drug idiosyncrasies; hay-fever; tendencies to hemorrhages from various organs; minute cutaneous angiomata; paroxysmal tachycardia, and other more or less closely related phenomena. As definite exciting causes and definite toxicopathological mechanisms are determined, definite nosologic groups may be separated and certain syndromes like those of Graves and of Raynaud made into diagnostic entities. Over and above these remain many vague and ill-defined conditions arising in response to any one of a number of different stimuli, among which temperature, weather, endogenous and ectogenous toxins, and emotion are most prominent. Hysteria, neurasthenia and epilepsy bear close but as yet undetermined relations to the condition, which may be predominant or apparently insignificant in their semeiology. The symptoms of the menopause are essentially vasomotor ataxic in character, but are a transient phase in the devolution of the female. Essential vasomotor ataxia is usually a congenital condition affecting, in different ways, several members of one family. At times it seems to be acquired in sequence to disease or accident.

In discussion Dr. Morton Prince of Boston spoke of these as perversions of physiological activity which in neurotic individuals became a fixed habit of the nervous system. Dr. B. Sachs of New York was inclined to regard these diseases from the mechanical rather than from the psychical standpoint. Graves' disease depended, he thought, upon modifications in the thyroid gland; Raynaud's disease and erythromelalgia were dependent upon strictly structural changes in the walls of the blood-vessels.

Ulcer of the Duodenum.—Dr. Henry Jackson discussed the features of duodenal ulcer and its consequent hemorrhage from the standpoint of differential diagnosis between duodenal and gastric ulcer. It is impossible at the present time to differentiate between these two conditions. Duodenal ulcer is more liable to cause hemorrhage and bloody stools may be more prevalent than bloody vomitus in this condition. Hemorrhage secondary to cirrhosis of the liver is often very closely simulated. In the treatment saline solution offers the best means at hand at the present time.

Dr. W. H. Thomson in discussion spoke of the greater prevalence of duodenal ulcer in men and the preponderance of gastric ulcers in women.

Hematemesis is not a distinguishing feature, but the symptoms in duodenal ulcer are not so often referred to the stomach. Dr. Janeway has noted in two cases of duodenal ulcer that there was marked dilatation of the stomach with stenosis of the pylorus, and he offers this as a possible diagnostic feature.

Prognosis and Treatment of Tuberculous Peritonitis.—Dr. F. C. Shattuck of Boston spoke of the accidental discovery by McDowell that opening of the abdominal cavity in tuberculous peritonitis often had a salutary effect on the progress of the disease. In order to obtain more definite notions concerning this belief, recently questioned by numerous writers, he has analyzed the statistics of the Massachusetts General Hospital from 1889-1900. In all 98 cases have been recorded, the subsequent histories of 59 of which Dr. Shattuck was enabled to follow. The prognosis was good in about one-half of all his cases. Twenty-eight cases were living at the present time, having been under observation for from two to eleven years.

Treatment.—Some patients get well under medical treatment alone, tapping and improved hygienic surroundings, but surgical intervention had given better results. Thus, of the cases treated medically at least two-thirds died, whereas of the cases treated surgically, opening, removal of fluid, removal of localized masses, etc., two-thirds recovered. Dr. Shattuck concluded that medical treatment was justifiable for from four to six weeks, but if after that time, under favorable hygienic surroundings and may be tapping, no improvement was noted, surgical intervention was imperative. Supportive and climatic treatment is called for in all stages of the disease independent of the mode of treatment.

Dr. J. W. Brannan stated that the experience at Bellevue Hospital supported the statistics given by Dr. Shattuck.

Dr. Billings said that there was need for greater differentiation of the anatomical types of the disease. Simple exudative forms with serous infiltration and localized tuberculous foci were of those that gave the best results in treatment, especially medical. Whereas if there were infiltrating masses with varying type of exudate or if there were nodular deposits and fibrous adhesions the prognosis he thought grave.

Dr. Halsted of Baltimore felt that Dr. Shattuck had outlined the situation much as he saw it in his hospital work. Tuberculin, he believed, was a very necessary adjunct in diagnosis and he would not like to relinquish the diagnostic aid given by its use.

Dr. Jacobi mentioned the results of his experience that many patients with tuberculous peritonitis recovered, but were less liable to do so if there was any general extension of the process to other organs.

Dr. Shattuck in closing demolished Dr. Billings' contention by his statistics.

Pathology of Smallpox.—Dr. James Ewing of New York spoke of four distinct pathological states in this disease, the primary hemorrhagic, secondary hemorrhagic, confluent and conglomerate, and the discrete types. He found the variolous eruption very prevalent in the mouth, fauces, larynx, trachea and bronchi; less on the mucous membranes of the genito-urinary tract. Diphtheritic-like inflammations were very common in the respiratory tract and the variolous poison seemed to act upon this mucous membrane earlier than upon the skin. Acute ulcerative endocarditis might occur; acute kidney degeneration was present in the primary hemorrhagic forms and in the severer grades variolous eruptions and diphtheritic necroses were present in the stomach. Enterocolitis was not uncommon and there was lymphatic hyperplasia.

Bacteriology of Smallpox.—Dr. Ewing found a streptococcus in practically all of the cases under in-

vestigation, twenty-nine in number. This, while it might be a secondary infecting organism, was not thought probable by the author. The possibility of a symbiotic relationship between this streptococcus and some factor as yet unknown was suggested. At all events, he thought that the acute fulminant types of the disease were regularly attended by this streptococcus and that it was a necessary factor in the production of this form. A constant blood-change was a great increase in the large mononuclear leucocytes.

Dr. Councilman of Boston reported on researches in the recent epidemic. He could not accept the streptococcus as of primary importance, but held that the smallpox virus, whatever it was, had the property of so reducing the resistance of the body that the streptococcus readily became engrafted on the original process. It is therefore a secondary infection. The destruction of the polynuclear neutrophils is a constant feature of the disease. This comes about because of the invasion of the medulla of the long bones. The large mononuclear leucocytes are produced in the spleen. Great interest centers about the bodies in the epithelial cells. Dr. Councilman does not believe them to be red blood-cells, nor yet any of the known products of cell degenerations, if they be protozoa they are of a type as yet not analogous to any known forms of these low animals.

Vaccine Virus.—Dr. W. H. Park of New York spoke of some recent work on the transference of smallpox to calves, monkeys and other animals and made some contributions to the knowledge of vaccine. Transference of smallpox material to three calves gave no results; to two monkeys, smallpox eruptions were found on the sixth day; a calf was vaccinated from the monkey vesicles and in six days showed typical discrete eruptions. Filtering vaccine does not seem to destroy its power.

Differentiation of Chickenpox.—The monkey has been shown to be non-susceptible to chickenpox and it is suggested by Dr. Park that this animal be employed to clear up important questionable cases of this disease.

Osteitis Deformans.—Dr. Morton Prince gave an excellent and extensive paper bearing on this rare condition. The main contention of the paper was that these hypertrophies and irregularities in growth of bony structures leading to manifold deformities have a like pathological basis and that the causation is some lesion of the central nervous system in the neighborhood of the trophic centers of bony structure.

Cirrhosis of Liver.—Drs. G. G. Sears and Frank Billings read papers bearing on the pathology and clinical histories of cases of cirrhosis of the liver. Dr. Billings showed that cirrhosis might result in the non-alcoholic, occurring in 20 per cent. of his cases. The most frequent early symptoms were morning nausea and vomiting, catarrhal gastritis and fermentative dyspepsia. In 65 per cent. of his cases there were digestive disturbances. Constipation was prevalent, while a few had diarrhea. Hemorrhoids were not necessarily an early symptom. Muscular rheumatisms were common, lumbago and bachache and neurastheniacal phenomena.

Treatment.—Old-fashioned saline aperients and hot water in the morning were advised. Mist rhei et sodæ and hydrochloric acid were prescribed. Occasionally muriate of ammonia in ten-grain doses. The saline purge and good hygiene were considered the most serviceable treatment.

Experimental Glycosuria.—Dr. C. A. Herter of New York read one of the most suggestive papers of the session. A complete abstract will appear in our issue of the MEDICAL NEWS for May 10. In brief he pointed out that many and probably most forms of glycosuria and diabetes are due to the action of substances or con-

ditions which interfere with normal oxidations in the cells of the pancreas. This generalization has been reached from a study of the glycosuria which follows the application of adrenalin chloride to the cells of the pancreas. When this substance is administered to animals under conditions that require its contact in unaltered form with the cells of the pancreas there results a glycosuria of a transitory character, associated with a slight or considerable increase in the glucose of the blood. This experimental glycosuria is most pronounced when the adrenalin is painted on the pancreas and it can be shown that when similar applications are made to other organs, as the liver and spleen, there is either no glycosuria or this is slight in degree. Experiments have been devised and executed which show that whenever adrenalin chloride, which is a powerful reducing agent, undergoes oxidation it is deprived both of its blood-pressure raising action and of its ability to cause glycosuria. This fact suggests that the glycosuria following the use of adrenalin is intimately connected with its reducing action upon the cells of the pancreas. Extended experimental inquiry brought to light the striking fact that substances possessing strong reducing power are capable of inducing glycosuria when applied to the pancreas directly. Thus the sulphurous acid, ammonium sulphide, carbon monoxide, benzyl alcohol, hydroxylamine, pyridine and piperidine are all capable of inducing a considerable glycosuria, whereas sodium chloride, chlorine water, bromine water, sodium hydroxide, hypochloric acid and ammonia alum, applied under similar conditions, have either no effect at all in producing glycosuria or cause only the most insignificant excretion of glucose. An observation of great interest is that potassium cyanide in small doses causes glycosuria, when applied to the pancreas, but not when introduced elsewhere. Since this poison deprives cells of their capacity to take up oxygen, its ability to induce glycosuria is a strong corroboration of the view here presented of the nature of glycosuria from reducing agents.

The Following Officers were Elected.—President, James Stewart; Vice-President, W. T. Councilman; Secretary, Henry Hun; Treasurer, J. P. Crozer Griffith; Recorder, S. Solis Cohen; Councillors, Charles G. Stockton and Walter Reed.

BOOK REVIEWS.

A REFERENCE HANDBOOK OF THE MEDICAL SCIENCES. Edited by ALBERT H. BUCK, M.D. Vol. III. Cbl. Equ. William Wood and Company, New York.

To pick out the many excellent features of this new edition would occupy more space than we can command. The early volumes but whetted the appetite for more and in this, the third, volume the many excellencies of the former numbers are but increased.

We believe that, with such a set of volumes as this on the physician's shelves, we would have the latest and most authoritative work on almost every subject germane to practical medicine.

THE ACCESSORY SINUSES OF THE NOSE. Their Surgical Anatomy and the Diagnosis and Treatment of their Inflammatory Affections. By A. LOGAN TURNER, M.D. (Edin.), F.R.C.S. Ed., Surgeon for Diseases of the Ear and Throat, Deaconess Hospital, Edinburgh. Longmans, Green & Co., New York.

CONSIDERING the comparative freshness of the subject, the interest associated with its study and investigation and the increasing frequency with which we are brought face to face with its pathological relations, the opportunity enjoyed by the author of this work has been exceptional. Unfortunately, a careful reading of the book

is attended with some disappointment, for, while the work is well done and fairly comprehensive, there is little in it which could in any sense be called "new." The great frequency with which sinus disease is encountered in practice, the lack of general knowledge of the anatomy of the parts affected, as well as of the refinements of treatment required under diseased conditions, make it necessary that general knowledge concerning it should be distributed as widely as possible.

The clearness and excellence of many of the illustrations and the descriptions of them will prove highly instructive to all readers. The chapters relating to Pathology and Treatment are only fairly comprehensive. Without question, the book will serve a useful purpose, but much more could have been made of it.

There are several features in connection with the work which are peculiar. While the evident intention of the writer has been to deal with the subject largely from the point of view of his own observations, too much has been done in this field by other investigators to make it possible to ignore entirely their work. We think that the book would have been strengthened if greater attention had been paid to the work of others; for instance, it would seem fair to expect abundant reference to the contributions of Zuckerkandl. We find, however, but one slight and unimportant reference to him, while the work of Bryan, of Washington, D. C., one of the most original and fertile of modern investigators, is not so much as mentioned. Contributions from many other American sources are too valuable to be ignored, especially in a work which has been placed directly upon the American market. It is to be hoped that the author will ere long prepare a revised edition of this monograph which will be more elaborate, especially in the department of treatment, and will better represent the actual progress made in the last ten years in this important field.

PROGRESSIVE MEDICINE. A Quarterly Digest of Advances, Discoveries, and Improvements in the Medical and Surgical Sciences. Edited by HOBART AMORY HARE, M.D., Professor of Therapeutics and Materia Medica in the Jefferson Medical College of Philadelphia, etc.; Assisted by H. R. M. LANDIS, M.D., Assistant Physician to the Out-Patient Department, Jefferson College Hospital. Volume IV., December, 1901. Diseases of Digestive Tract and Allied Organs, Liver, Pancreas, and Peritoneum; Genito-Urinary Diseases; Anesthetics; Fractures, Dislocations, Amputations; Surgery of the Extremities, and Orthopedics; Diseases of the Kidneys; Physiology; Hygiene; Practical Therapeutic Referendum. Lea Brothers & Co., Philadelphia and New York, 1901.

THIS volume of "Progressive Medicine" continues the interest of former numbers. Dr. Max Einhorn's review of diseases of the digestive tract is especially suggestive. With regard to sedatives in gastric affections, there is a quotation from some of Riegel's work on the action of morphine and atropine on gastric secretion that is of special practical value. According to Riegel's investigation morphine increases gastric secretion while atropine lessens it. It appears rational, therefore, to administer atropine in painful gastric affections accompanied by an excess of hydrochloric acid and rather to avoid the use of morphine. There is a citation from a recent work which shows that though mucous-membranous colitis is probably due to a disturbance of the secretory functions of the nerves superintending the bowels, or, at least, that this is always an underlying cause of the affection, local treatment by means of flushings of the bowel with hot water is extremely useful.

The review of the action of glandular extracts is also

a very suggestive chapter of the book. Other portions of the department devoted to physiology, of special interest to those interested in neurology, are found under the subheads "Reflex Anuria," "The Effect of Limited Nerve Compression," "The Fundamental Properties of Nerves under the Influence of Certain Poisons," "The Physiology of Nerve Inhibition Phenomena," "The Physiological Significance of the Hippocampus Major" and "The Action of Ether and Chloroform on the Neurons of Rabbits and Dogs."

THE USE OF THE RÖNTGEN RAY by the Medical Department of the United States Army in the War with Spain. 1898. Prepared under the Direction of Surgeon-General George M. Sternberg, United States Army, by W. C. BORDEN, Captain and Assistant Surgeon, U. S. A. Government Printing Office, Washington, 1900.

In the American Civil War the mortality was nearly double that of the Spanish-American War. A series of valuable tables in this admirable publication present graphically the answer to the question that naturally arises as to whether this difference be due to the use of the small-caliber rifle or to modern surgical methods. It shows that mortality from the wounds of the head, face, neck, spine and abdomen did not materially differ in the two wars. In chest wounds and also in wounds of the extremities there is seen to be only a little more than one-third the mortality that attended similar lesions in the war between the States.

The apparatus used was both of the coil and static type. Inasmuch as dynamos were rarely available, the current in the first case had to be obtained from primary or secondary batteries—of the two, the static was the more practical.

Other interesting conclusions are reached on the question as to where the apparatus should be best placed, in field or in general hospitals and hospital ships. Because lodged bullets rarely require immediate removal; because field hospitals cannot be made so aseptic as general hospitals, and for other reasons, it seems much wiser to restrict the use of this diagnostic aid of the more stable buildings.

The reports are remarkably well presented in clear, concise form, the illustrations are made from most beautiful Röntgen plates and the printing by the Heliotype Printing Company of Boston combines clearness with a beautiful softness which is quite unusual.

THE PRACTICAL MEDICINE SERIES OF YEAR-BOOKS. Volume IV. GYNECOLOGY. Edited by EMILIUS C. DUDLEY, A.M., Professor of Gynecology Northwestern University Medical School; Gynecologist to St. Luke's and Wesley Hospitals, Chicago. With collaborations of WILLIAM HEALY, A.B., M.D. The Year-Book Publishers, Chicago.

No attempt has been made in this little volume to go into the minute details of all the work that has been done in this line during the last year; but the editor has endeavored to give the busy practitioner a brief résumé of the more important research and operative work that has been accomplished in gynecology. In this, Dr. Dudley has succeeded. After quoting from the various periodicals, there are bracketed notes by the editor commenting upon the article when such are practical. The illustrations are copious, are taken from the original articles, and add not a little to the value of the publication.

ENZYMES AND THEIR APPLICATIONS. By Dr. JEAN EFFRONT, Director in the new University in Brussels and Director of the Fermentation Institute. English Translation by SAMUEL C. PRESCOTT, S.B. Vol. I.

The Enzymes of the Carbohydrates. The Oxidases. John Wiley & Sons, New York.

It is only within comparatively recent times that a riper acquaintance with the problems of fermentation has made it possible to publish such a work as the present one. Viewed from an economic point alone this work is of incalculable value to all those workers in the technical industries concerning brewing, the making of wines, etc. From a broader standpoint, however, the volume is one for the chemist, the biologist, and the research-worker in medicine.

CONTRIBUTIONS TO PRACTICAL MEDICINE. By SIR JAMES SAWYER, Knt., Senior Consulting Physician to the Queen's Hospital, Birmingham, England. Third Edition, Revised and Enlarged. Cornish Brothers, Birmingham.

COLLECTIONS of essays on subjects connected with medicine usually have no very extensive sale. The fact that Sir James Sawyer's book has reached its third edition is a proof therefore that it must contain some very interestingly practical materials. The present volume contains some additional chapters and an amount of new material is added to old chapters. Some of the essays are typical studies in the best English clinical vein and English physicians are probably the most practical in the world in important subjects. The discussion, for instance, of the cure of insomnia contains more excellent hints than we have ever seen gathered together on this subject. The cure of habitual constipation is another subject that is treated very, very well. There are besides hints as to the cure of gastralgia, on the treatment of hemorrhoids, the cure of eczema and of other affections, that, while not serious, are often the bane of the patient's and of the physician's existence.

BOOKS RECEIVED.

The MEDICAL NEWS acknowledges the receipt of the following new publications. Reviews of those possessing special interest for the readers of the MEDICAL NEWS will shortly appear.

A PRACTICAL MANUAL OF INSANITY. By Drs. D. R. BROWER and H. M. BANNISTER. 8vo, 426 pages. Illustrated. W. B. Saunders & Company, Philadelphia and London.

THE PRACTICAL MEDICINE SERIES OF YEAR-BOOKS. Vol. IV. Gynecology. Edited by Dr. E. C. DUDLEY. The Year-Book Publishers, Chicago.

THE TREATMENT OF NEURASTHENIA. By Drs. A. PROUST and G. BALLEST. Translated by P. O. Smith. Henry Kimpton, London.

LES FONCTIONS HÉPATIQUES. Par MM. A. GILBERT et P. CARNOT. 12mo, 287 pages. Illustrated. C. Naud, Paris.

SEVENTEENTH ANNUAL REPORT OF THE BUREAU OF ANIMAL INDUSTRY FOR THE YEAR 1900.

DISEASES OF WOMEN. By Dr. F. H. DAVENPORT. Fourth Edition. 12mo, 404 pages. Illustrated. Lea Brothers & Co., Philadelphia and New York.

TEXT-BOOK OF ANATOMY AND PHYSIOLOGY FOR NURSES. By DIANA C. KIMBER. 8vo, 265 pages. Illustrated. The Macmillan Company, New York.

THE DRUG HABITS AND THEIR TREATMENT. By Dr. T. D. CROTHERS. 12mo, 100 pages. G. P. Engelhard & Company, Chicago.

A HAND-BOOK OF APPENDICITIS. By Dr. A. J. OCHSNER. 12mo, 176 pages. G. P. Engelhard & Company.

CONTRIBUTIONS TO PRACTICAL MEDICINE. By Dr. J. SAWYER. 12mo, 209 pages. Third Edition. Cornish Brothers, Birmingham.